MGH News

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Transferred Tissue Helps to Mend Gaping Wounds

A New Dimension in Ambulatory Care

Plagued by psoriasis disfiguring 80 percent of his body and unresponsive to customary care, including treatments combining light and drugs (photochemotherapy), George L. had reason to feel bitter.

Every three months or so he entered a hospital for two or three weeks to receive applications of special creams that removed scales from his skin.

On discharge, he knew it was just a matter of time before the disease would disrupt his life again.

Today, George continues to receive closely supervised hospital care, but for the first time in a long while he is living a near-normal existence. His bitterness has also vanished.

An expansion of dermatologic services offered in the MGH's Ambulatory Care Center accounts for the patient's improved life-style and outlook. The added services include a Day Treatment Center, which may be a first of its kind in the nation, and a Dermatologic Surgery Unit.

In the Day Treatment Center which assumed George's care, specially trained nurses and nurse technicians provide a wide variety of complex or prolonged dermatologic treatments under the continuous supervision of physicians.

George visits the center frequently, but the staff strives to schedule treatment at times that do not conflict with the patient's work routine. More important, his family life has returned to normal.

In underlining the improved situation, Dr. Ernesto Gonzalez, Chief of the Der-

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Assisted by Kathleen O'Toole-Davis, RN, left, Dr. Jessica Fewkes uses a microsurgical technique to remove a skin cancer from the temple of Frederick Bradley in the ambulatory Dermatologic Surgery Unit.

Large portions of tissue obtained from the chest wall or inner thighs are enabling MGH surgeons to save many badly injured or infected legs from amputation.

Since 1977, more than 50 MGH patients, most of them victims of motor vehicle accidents, have obtained relief from severe, bone-exposing leg wounds because of a microsurgical procedure called a free tissue transfer.

The operation involves closing a wound by using a portion of sheet-like chest muscle (latissimus dorsi) together with a vein and artery, plus skin from a buttock, or by transferring tissue, blood vessels, and skin from a thigh.

Most of the patients had undergone at least a dozen operations and were plagued by a chronic draining of pus from their wound. One man endured such drainage for 20 years. A quarter of the individuals said doctors had recommended a leg amputation.

Conventional treatment failed because the injuries occurred in the lower third of the limb with its comparatively poor supply of blood. Extensive damage to the skin and underlying tissue in that area invites infection. If bone at the base of the wound loses its blood supply, inflammation of the bone (osteomyelitis) sets in, and the segment may die. Dead bone acts as a host for bacteria.

If the injury were near healthy tissue with a good blood supply, a surgeon might simply rotate that tissue into the wound and close it, thus reducing chances of infection (*MGH News*, March 1978). From the calf on down, however, there is precious little extra tissue to serve as a flap.

In 1962, when Dr. Ronald A. Malt of the MGH wrote medical history by performing the first successful replantation of a severed human limb, he proved that even

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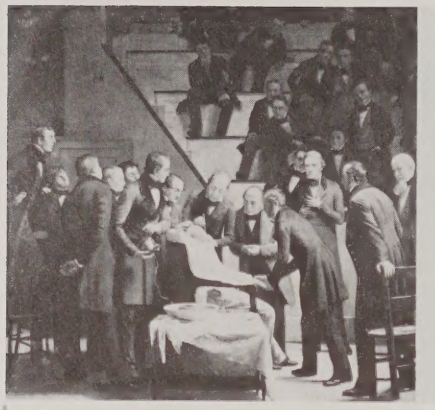

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EDITORIAL:

An Old Experiment Pays New Dividends

In 1869 the MGH began an experiment in which the Board of Trustees delegated women to visit patients. With trepidation and a liberal dose of skepticism, the Trustees initiated the "Ladies Visiting Committee." This year the experimental creation will turn 115 years old. The L.V.C., as it is popularly known, may just be the oldest hospital auxiliary in the United States. Age aside, the group ranks as one of the most important in this hospital. It donates everything from medical equipment for patient care to toys for children hospitalized at holiday time and wigs for needy cancer patients.

Yet many people are unaware of the L.V.C.'s existence, let alone its purpose. The group quietly operates some of the best-known, nonmedical functions in the hospital: two gift shops, a flower shop, and a beauty shop. When visitors and employees buy goods or services in any of these shops, they are helping to support the patient care activities of the L.V.C. The L.V.C. plows back into patient related activities every cent of net income from the shops.

Now they have pledged the largest single donation in their history. Over the next five or more years, they will give the MGH a quarter of a million dollars for the hospital's Capital Campaign. The gift has pushed the campaign close to its interim goal of $65 million by December 31, 1983. Other gifts allowed the campaign to achieve that interim mark by year's end.

Although some portions of the campaign are doing especially well, others are lagging. The new Wellman Research Building nearing completion has attracted considerable donations. On the other hand the patient care building program is struggling. And that is where the hospital needs the most help. The overwhelming portion of the Capital Campaign will replace or renovate existing patient care floors. Not one additional new bed will result, but many rooms that are too old and inefficient will disappear. In their place will appear patient care areas that will match the quality of professionals serving patients with rooms that promote efficiency.

The MGH is grateful to the L.V.C. for its gift. As Dr. J. Robert Buchanan, General Director, said, "It assures that the traditional concerns of the Ladies Visiting Committee for creating a hospitable and caring environment will be a part of the new facilities we are planning to create for our patients."

Tissue Donor Sites Endure Little Harm

(Continued from Page 1)

after blood flow to tissue stops, the tissue can be replanted and can still live.

This knowledge set the stage for free tissue transfers. Initially, doctors selected the operation as the only solution possible. Later, they opted for transfer surgery when a patient was at high risk and the procedure seemed to promise the best outcome. Today, there is a third qualifying category. The patient might not be at high risk, but the quality of the transfer donor site might far overshadow that of the alternative donor site.

"Since the series involving osteomyelitis began, we have yet to lose a free flap or see chronic drainage persist after a transfer," said Dr. James W. May, Jr., Chief of Plastic and Reconstructive Surgery and of the Hand Surgery Service in the MGH Department of General Surgery.

He cautioned, however, that despite the favorable results to date no one can pronounce any patient cured. He said much more time must elapse before that claim can be made.

"In any kind of plastic reconstruction," Dr. May said, "there is a price to pay for the donor material. When you repair a defect, you have to create another one somewhere else to get the needed tissue. We think that in our present efforts we are using donor sites that provide better and more useful tissue than we had before."

The portion of latissimus dorsi muscle taken for a transfer lies under an arm. When the patient's arm hangs by his side, the relatively small incision made by the surgeon goes undetected.

The muscle's primary purpose is to draw the arm in toward the chest. When the latissimus dorsi segment is removed, however, two other muscles take over that function.

Dr. May and his colleagues prefer to use the latissimus dorsi tissue because it is larger and has a better blood supply than the muscles from the thigh.

The surgical team first removes all contaminated tissue and bone from the leg wound, then installs the free tissue flap, including hookup of the transferred vein and artery.

Four or five weeks later, after the flap and antibiotic treatment have disposed of

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Photographs: Pages 1, 4, 5 (upper), 8, Myron Daniels; p. 3, courtesy of Dr. James W. May, Jr.; p. 5 (lower), John Charles; p. 6, courtesy of Elena Volante, McLean Hospital; p. 7, Clayton Hubbard

the original infection, orthopedic surgeons raise the flap, perform any necessary bone reconstruction, then restore the flap. Bone replacements usually come from the patient's hip.

Dr. May emphasized that not everybody with osteomyelitis of the leg requires a microsurgical solution to the problem.

"In some situations, such as when good tissue donor sites lie close by, the conventional procedures are preferable," he said.

"Surgeons can often perform the traditional methods faster, more easily, and at less expense than the transfers, thus reducing the burden on the patient, the doctors and nurses, and the hospital."

An MGH surgical team that included Drs. John D. Constable, Leslie W. Ottinger, Alfred M. Cohen, and May performed in 1975 what was probably the first elective microvascular free tissue transfer in the eastern United States.

The patient was unable to swallow because cancer had forced removal of a segment of his food-carrying pipe (esophagus). After vain efforts to use all conventional procedures to restore ability to swallow, the surgeons replaced the section of the patient's missing esophagus with a segment of his small bowel. Soon he was eating normally again.

The next free tissue transfer at the MGH took place about two years later and involved a 10-year-old boy born without thumbs.

Dr. Richard J. Smith, Chief of Hand Surgery in the Orthopaedic Service, and Dr. May transplanted the boy's big toes to his hands, converting the toes into thumbs. The young patient quickly became accustomed to the new digits. He was often seen holding a cue stick with a new thumb as he played pool in the hospital's pediatric unit.

The practice of doing free tissue transfers progressed slowly at first, then increased in momentum and expanded as surgeons grew more confident in the technique and began to realize its broad applications.

"Transfer operations that were in their infancy only eight years ago and were done by only a few people here at the MGH are now being performed by several of the hospital's surgical services," Dr. May said. "The operations include orthopedic free bone transfers.

"At least four of the seven active staff members in plastic surgery now engage in transfer work. From one tissue transfer a year, the practice has grown to probably two or three a month."

A major obstacle stands in the way of an all-out microsurgical effort, however, and that is a shortage of available cadavers for medical study.

"In order to implement microsurgical techniques, it is crucial that doctors have the means to learn how to do these procedures," Dr. May stressed.

"I wish more people realized the great contribution they could make toward human welfare by willing their physical remains to further medical knowledge."

Medical centers at Johns Hopkins University and the University of California, San Francisco, are also actively engaged in free tissue transfers, and just recently they joined the MGH in a study concerning use of the procedure on patients with osteomyelitis.

The principal question being asked is: For how long must doctors prescribe antibiotics to such a patient to have a successful result?

"It takes about 10 days for both the patient's donor site and recipient site to heal," Dr. May said, "but because of their need for antibiotics we sometimes have kept these patients in the hospital for up to six weeks. It may not be necessary to treat them for that long a period. We are hoping the multicenter study will give us guidance on this point."

Patients have been referred from all over the United States and several foreign countries for chronic leg wound treatment. Dr. May told of a New York man who had suffered a devastating leg injury in an accident before coming to the MGH.

"When he first came into my office, he was on the verge of losing his job," the doctor related. "His marriage was very shaky, and everyone was urging him to have his leg amputated.

"Some time after undergoing a microsurgical free tissue transfer to repair his injury, the patient sent me a letter asking, 'Could you please forward a note saying that I can go back to work?'

"When such a patient writes that he's ready and anxious to get back into the swing of things, you know that something worthwhile has been accomplished." ■

(See related article at bottom of Page 4.)

To repair the deep, open, chronically infected leg injury shown at left, surgeons transferred a section of sheet-like muscle, together with a vein and artery, from a side of the patient's chest to fill the wound and resume a blood supply, then covered the area with skin taken from a buttock. Photo at right shows leg six months after the operation.

As Dr. Ernesto Gonzalez looks on, Nurse Technician Deborah Falvey treats an ulcer on the leg of Nelda Cochran in the Dermatologic Day Treatment Center.

Skin Experts Widen The Scope of Their Ambulatory Service

(Continued from Page 1)

matology Ambulatory Care Service, said that the patient's skin has been clear since shortly after he began visiting the Day Treatment Center four months ago.

Dr. Gonzalez described the center as an intermediate care facility, complementing acute care provided by the general ambulatory service.

"Ambulatory visits are necessarily brief," he said. "Customarily, the physician examines the patient, diagnoses the problem, prescribes treatment, and sends the person home.

"In situations where proper care cannot be given at home, patients in the past have had to be admitted to the hospital. Now we have a unit which can accommodate pa-

Changing an Operation in Midstream

The versatility of the free tissue transfer procedure (See Page 1.) was demonstrated dramatically when surgeons performing the operation encountered unexpected complications and had to improvise.

A planned eight-hour operation to repair the left leg of 30-year-old Christine Reeves of Fort Worth, Tex., injured in a motorcycle accident, stretched to 20 hours.

An arteriogram (a special X ray showing blood vessels) had indicated which leg vessel would provide the best blood supply to the muscle flap being transferred to fill in the wound, situated halfway between the knee and ankle.

"But when we tapped into the artery, after already transferring and sewing the muscle into place, blood just trickled out of the vessel," said Dr. James W. May, Jr., who directed the surgical team. "The artery was inadequate to supply the transferred muscle.

"We knew that if the flap did not work, an amputation would be necessary. So basically it was either give up at that point or develop some alternative solution."

The events that followed were unprecedented in the series of free tissue transfers recorded at the MGH since 1977.

"We changed the operation in midstream," said Dr. May.

Originally, the plan called for hooking up an artery and a vein from the lower part of the flap to corresponding vessels at the lower end of the leg. Dr. May decided to turn the flap around so that its vessels could connect with a more adequate blood flow behind the knee.

This required some vascular improvising, however, because the healthier vessels were some distance from the wound.

The surgeons removed the flap and preserved it in iced saline sponges for three hours while they took a vein graft from the patient's uninjured leg and cut it in two. They then used the two portions to link the flap vessels and those behind the knee.

Immediately after joining the vessels the surgeons could see blood coursing through them.

Following her accident in February, 1982, Christine underwent 14 operations in Texas where doctors offered little hope of saving her leg. Today, although she faces another MGH procedure to restore lost bone, her outlook has never been brighter. ■

Recuperating after a 20-hour operation to repair her injured left leg with transferred tissue, Christine Reeves chats with Joanne Hughes, RN, Head Nurse on the ninth floor of the White Building.

tients as often as five days a week, and for as long as five hours a day, if need be. The center is even open three evenings a week until seven o'clock."

Of the 14 to 16 patients seen daily in the unit, several have psoriasis. Unlike George, most respond well to photochemotherapy, provided in a special area nearby, but they must obtain separate treatment for the scalp. The light used in photochemotherapy does not penetrate hair.

Dr. Gonzalez proposed establishment of the center, which he personally directs, after visiting a similar facility which had been set up at the University of California, San Francisco, exclusively for the treatment of psoriasis sufferers.

"What we offer, however, is a variety of treatments for perhaps 20 different skin conditions," said the doctor, who is also Assistant Professor of Dermatology at Harvard Medical School. "I know of no other day treatment center in the country which offers that extent of care."

Patients suffering from leg ulcers, usually the result of impeded blood circulation, welcome the new center because such ulcers heal very slowly. If day care were unavailable, those patients could spend many weeks in a hospital.

Other conditions seen in the Day Treatment Center include various forms of eczema, such as atopic dermatitis, which can cause generalized itching and thickening of the skin; mycosis fungoides (a form of malignancy), characterized by red plaques, scaling, itching, and sometimes even tumors; blisters induced by some immunological disorder; and, during the summer, severe poison ivy (contact dermatitis).

Assisting Dr. Gonzalez in the unit are Dr. Khosrow Momtaz, Maureen Constantino, RN, and Nurse Technicians Deborah Falvey and Lianne Csicsek. Joan E. Clark, RN, serves as Unit Manager, or administrative head, of the center.

Like the Day Treatment Center, the Dermatologic Surgery Unit, opened only six months ago, carries out a wide range of services.

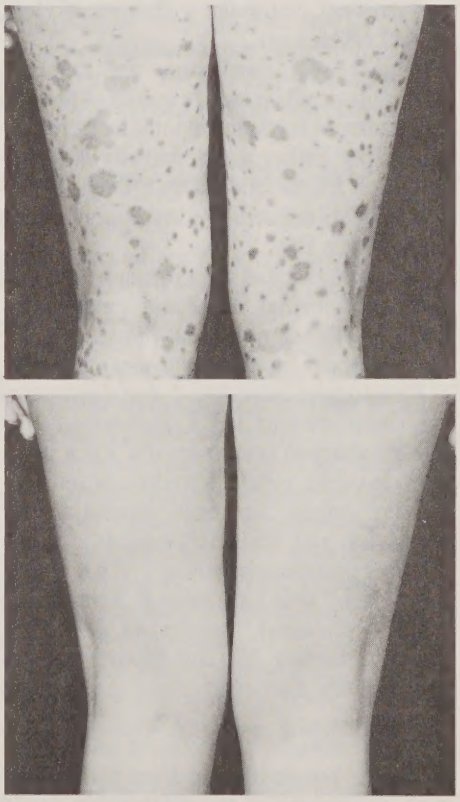
Chief among them is controlled microsurgery, a stepwise excision of skin cancers using the microscope to define the extent of the lesion. Dr. Jessica L. Fewkes, who directs the unit, received special training in a procedure developed by Dr. Frederic Mohs of the University of Wisconsin.

"Since the Mohs technique enables us to view microscopically exactly where the tumor is spreading, we sacrifice the least amount of normal tissue and enjoy the highest cure rate possible," Dr. Fewkes said.

Depending on where the tumor is situated and the extent of tissue loss necessitated for complete removal, Dr. Fewkes may work closely with such other specialists as plastic surgeons, ophthalmologists, or otolaryngologists (ear, nose, and throat experts) who would help plan later repairs.

Performing one of the principal tasks of her team in the Dermatologic Surgery Unit, Dr. Jessica Fewkes evaluates a suspicious lesion.

The Surgery Unit evolved from a need for expertise in ambulatory dermatology to assess suspicious lesions, to determine whether a patient would be a suitable candidate for any necessary surgery, and to render definitive opinions about the cosmetic results of any contemplated procedure.



Patient with psoriasis resistant to customary treatment obtained relief at the Dermatologic Day Treatment Center.

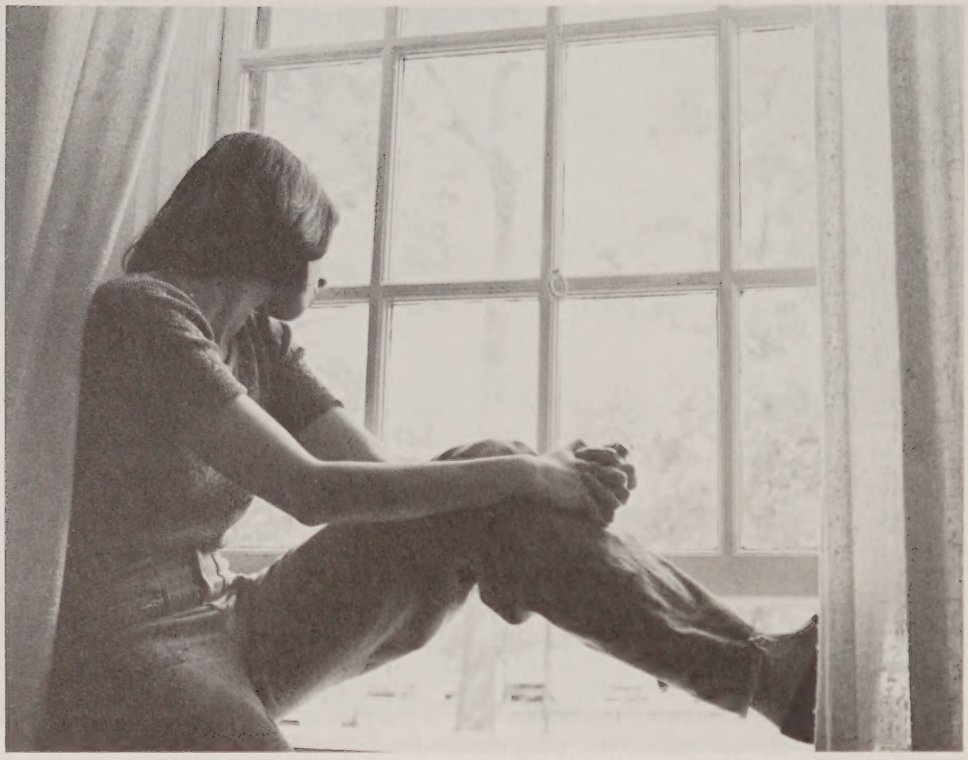
Frequently, Dr. Fewkes is able to move ahead almost immediately in the outpatient unit to remove such tumors as basal- or squamous-cell cancers, 95 percent of which are attributed to excessive exposure to the sun's ultraviolet rays, and dysplastic, or atypical, nevi (birthmarks) which may indicate impending melanomas, a particularly serious form of skin cancer.

Dr. Fewkes, who is also Instructor in Dermatology at Harvard Medical School, said the Mohs procedure, which she studied under a year-long fellowship at Duke University, is particularly appropriate for nine or more conditions.

"But probably its most frequent use," she said, "is in treating recurrent skin cancers. These are cancers which have developed in scars and which are very difficult to delineate, except through a microscope."

Kathleen O'Toole-Davis, a staff nurse, and Helga Scanlon, a laboratory technician, assist Dr. Fewkes.

In expanding its ambulatory services, the MGH Dermatology Department has not only made it more convenient for patients to receive specialized skin care but has also generated potentially great savings for every patient who might otherwise have faced long hospitalization. ■



Although most daydreams last only a few seconds, they account for a significant portion of the average person's daily thoughts.

Daydreams: More Than Idle Thoughts

For 3½ years Jan Vanderbie lived in a world of his own creation.

He had to, if he wanted to survive.

A few months after the Japanese attacked Pearl Harbor in December, 1941, they swept through the Dutch East Indies and incarcerated some 200,000 people.

Jan, the 17-year-old son of an official of the colonial government, was among the prisoners. He was shifted from camp to camp, never to see freedom again until after the war ended in 1945.

"Many people threw up their hands, said they could endure the hardships no longer, and soon died," recalled Mr. Vanderbie, now 59, a former administrator at the United States Army's Research and Development Laboratories in Natick, Mass.

"But I and others found that we could keep going by deriving strength from daydreaming. In a sense, we kept our minds sharp by living in a fake world."

The survivors dreamed of being liberated in 90 days. "We knew we could cope for three months," said Mr. Vanderbie. "Of course, freedom was not that near, but we clung to our dream.

"We found that in a camp where food was scarce and beatings often took place one could set his thoughts on another wavelength and live a life that was not only sustaining but even pleasurable. We did a tremendous amount of daydreaming about food. We cooked up the most beautiful meals."

In his epic work *Paradise Lost,* written when he was blind, English poet John Milton held that "the mind is its own place and in itself can make a Heaven of Hell; a Hell of Heaven."

Simply put, daydreams are fantasies which occur while we are awake. Although these temporary suspensions from reality often arise rather spontaneously and may last but a few seconds, they are usually inspired or stimulated by some experience in one's active life.

The thoughts that float through the mind during a normal daydream customarily make perfect sense. Few daydreams are characterized by bizarre flights of fancy.

Researchers have found that daydreams can help people solve problems, plan ahead, sharpen concentration for a competitive event, relieve boredom or tension, reduce anger, increase potential for creativity, and build self-esteem.

"After encountering situations which distress them," said Dr. Owen S. Surman, an MGH psychiatrist, "people can guide their personal fantasy life and daydreams in a positive way, thus overcoming the stressful thoughts."

As an example, an executive undergoing a stressful hospitalization distracted himself with daydreams of his pleasurable world travels.

The channeling of energies from one situation, possibly an illness, into a creative endeavor is an important defensive function known as sublimation.

A person, trying to cope with a malady, starts a self-help group or donates toward research to find a cure for that disease. The gestures, which might take place only in the person's mind, could ease the stress of the illness.

Rehearsal plays an important role in fantasy production. Individuals tend to go over events they expect to occur and to plan and strategize. They also may rehearse fantasized outcomes, sought-after situations that probably will not occur; wishful thinking, if you will.

Daydreams also have a debriefing function. "In our fantasy life," Dr. Surman said, "we can debrief ourselves on events that occur during the day, go over discussions that we had, edit them, change things, figure out how things might be done otherwise at some future time."

Psychiatrists sometimes use fantasy in treating a patient. An individual seeks help to overcome a fear of confined spaces (claustrophobia). The patient cannot tolerate wearing a watch or a ring, or even having the collar buttoned.

Using a procedure called systematic desensitization, the psychiatrist first relaxes the patient. This can be done while the person is awake but with the eyes closed or after hypnosis. Hypnosis simply sharpens attentiveness.

The doctor then suggests that the patient imagine being in a setting that is mildly phobic, or anxiety-producing: wearing a ring, for instance. By pairing this image with the new restful state, the patient begins to think about the ring without becoming anxious.

The individual can then apply the same technique in overcoming discomfort of the watch or the buttoned collar, and ultimately even fear of a crowded elevator.

Dr. Surman, who is also Assistant Professor of Psychiatry at Harvard Medical School, originated a somewhat different procedure which he likes to employ with patients having performance problems.

A person taking a course in college, let us say, is facing an important examination and fears the results. To put the patient into a more confident frame of mind for the challenge, Dr. Surman resorts to a technique which he calls "postnoxious desensitization."

He has the person imagine being outside the examining room, test completed. "We don't describe the results," the doctor declared. "We simply suggest that the patient used knowledge and resources to the fullest in responding to each question."

The doctor then takes the person sys-

Medical Team Tests A Possible Means Of Judging Pain

When a patient suffering from a distressful injury or illness is able to relate how he feels, the task of the attending physician in assessing the need to ease the pain becomes simpler.

But what about the patient who because of his age or condition is unable to communicate? Since pain is a wholly personal sensation and few people experience it in quite the same way, the doctor often faces difficulties in managing these patients.

To help colleagues determine how much pain reliever such an individual must have, an MGH team working at the affiliated Shriners Burns Institute and with Shriners' funding has developed a potential method of measuring pain through a series of tests.

The team emphasized that its study is still too preliminary to know how useful the technique may become.

The tests measure the patient's blood plasma to determine its level of a naturally occurring, morphine-like hormone called beta-endorphin.

Beta-endorphin is a member of a family of chemicals which seem to play a major role in the body's defense against pain. The first such chemicals to be identified were discovered in 1975 by Scottish researchers.

Dr. Stan K. Szyfelbein, an MGH anesthetist and Chief of Anesthesia at the Shriners, who initiated the study, reported on the still early pain assessment work at the October annual meeting of the American Society of Anesthesiologists in Atlanta.

Dr. Patricia Osgood shows a scale used in a pain level study to a young patient at the Shriners Burns Institute.

Dr. Szyfelbein, Patricia F. Osgood, Ph.D., a pharmacologist; and Dr. Daniel B. Carr, an endocrinologist, studied 15 acutely burned children ranging in age from 8 to 18 years admitted to the Shriners Burns Institute during a 13-month period. The extent of their burns ranged from 5 to 85 percent of body surface area.

These children were able to communicate. During burn-dressing changes—probably the most painful procedure they had to endure—the young patients conveyed the degree of their discomfort by calling out or pointing to a white number on a large thermometer-like red scale.

The scale listed numbers ranging from 0 at the bottom to 10 at the top, as well as their meaning. 0 meant "no pain" and 10 "pain as bad as it could be."

A blood sample was also taken: (1) about an hour before the change, (2) after an oral pain medicine had been given and just before the start of the change, (3) at the end of the change, (4) one hour after that, and (5) two hours after the new dressing had been put on.

The pain evaluation study involved a total of 33 dressing changes. Drs. Szyfelbein and Osgood obtained the samples and pain scores. Dr. Carr and his associates processed the samples using a procedure called radioimmunoassay.

Dr. David C. Hoaglin, a statistician at the Harvard University Science Center, confirmed that in a significant number of patients beta-endorphin plasma levels were high when pain was low, indicating a protective effect of some kind. The endorphins were low when there was considerable distress.

In general, the hormonal-pain measurement for each patient remained fairly constant during the course of a single day's examination. Changes that did occur were noted principally during comparison of tests conducted on separate days.

The next phase of the study will include children unable to physically indicate their degree of pain.

(Concluded on Page 8)

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tematically backward: handing in the paper, in the middle of the exam, beginning the test, studying for the test. Each time, the patient imagines being relaxed and well in control.

Dr. Surman has used the same type of approach to help patients overcome fear of a planned surgical procedure.

The therapist can sometimes achieve elimination or reduction of physical pain through visual imagery.

"One may associate pain with color," Dr. Surman said. "Typically, a patient will link pain with the color red and absence of discomfort with green or blue. We can request that a person picture something red and convert it to green or blue. As the color changes, the suggestion is that the pain is decreasing as well."

Similarly, one can draw on fantasy to have a person imagine that one hand contains a special analgesic and that all that is needed to relieve pain in a sore abdomen or shoulder is to place the hand on the affected area.

Dr. Surman actively consults with the MGH Transplant and Dialysis Units where this type of technique has at times proved beneficial for patients.

Still another visual imagery technique is used in breaking a behavior pattern. To stop a smoking habit, for example, a therapist might have the patient pair a negative image with the behavior: "While puffing on a cigarette, imagine you are inhaling from the tailpipe of a city bus."

The visual imagery techniques are generally combined with hypnosis, but the principle remains the same, with or without hypnosis.

People who are depressed often fill the mind with self-deprecating thoughts: "I shouldn't have said that." "I should have done it this way."

The therapist strives to reverse that kind of negative self-feedback by helping the patient identify with successes rather than past failures.

Dr. Surman commented that encouragement of relaxing daydreams and fantasy is the intention of a new videotape program on self-hypnosis being offered to hospitalized patients at the MGH. The videotape, a joint project of the Departments of Psychiatry and Nursing, was filmed for WMGH-TV, the hospital's closed-circuit TV network.

A quotation cited on this new WMGH-TV relaxation film is attributed to Dr. Albert Schweitzer:

"Each patient carries his own doctor inside him. We are at our best when we give the doctor who resides within each patient a chance to go to work." ■

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Pain Study Launches Lengthy Project

(Concluded from Page 7)

Dr. Carr emphasized that "we don't feel the endorphin molecules we measure in blood are necessarily serving as analgesic [pain reducing] agents in the brain. But we think the blood value may tell us something about the state of arousal of the person and, in that indirect way, speak to some process going on in the brain."

He pointed out that there are other indices of arousal with analgesic potential, such as enkephalins and dynorphin which are in chemical families related to beta-endorphin, and stress-related hormones like adrenalin.

"We don't really know which hormones provide the best index for pain," he said. "Hopefully we will study many of them in the future."

In refining methods of measure, Dr. Carr added, "we have to make sure that they are not interfered with by the number of transfusions a patient has had or by some artifact such as a protein which might mimic some other effect in the assay."

A study by a group from the National Institutes of Health tends to support the initial Shriners–MGH findings. In the other investigation, individuals who had the highest endorphin levels before surgery required the least amount of analgesics during their recovery. This was an adult population.

Often unable to communicate because they are too young or are on respirators, children in pain are among patients who can most benefit from pain research.

The Shriners–MGH research is believed to be the first involving children.

"Children at Shriners all have painful injuries that require frequent dressing changes, and they may be hospitalized for two months or longer," said Dr. Osgood.

"When they first arrive, they, of course, are very stressed; we can't get an immediate baseline assessment of their endorphin levels. But six months or a year after their discharge, they return for a checkup in a nonstressful state, and we can get another blood sample at that time."

Dr. Szyfelbein, who with his colleagues teaches at Harvard Medical School, also pointed out that children in the study can serve as their own so-called "controls" when they begin painful reconstructive procedures two or three years after their initial care.

"We would know from the earlier studies," he said, "the kinds of pain that each child might experience and what was necessary to avoid that discomfort."

"It is most appropriate that this hospital and department be involved in this kind of study," said Dr. Richard J. Kitz, Chief of Anesthesia at the MGH. "The work continues a tradition which began right here in October, 1846 with the very first public demonstration of anesthesia in surgery."

Dr. Kitz said that pain researchers have long neglected the plight of very young children because of frequent inability to communicate with them. The children might be too young to express themselves or unable to speak because they are on respirators. And yet the young as a group are among the patients who can most benefit.

"In a child, every pain experience has a component of fear," the doctor added. "How much of the suffering is fear and how much actual pain? Hopefully these studies can help provide the answers."

When more is known about beta-endorphin and other naturally occurring opiate-like compounds, physicians might learn to regulate the body's own production of them, Dr. Kitz said. Eventually, patients might be able to get away from taking painkilling drugs and thus avoid objectionable side effects that sometimes accompany these medications. ■

Dr. Stan Szyfelbein, who initiated the Shriners–MGH pain study, joins Thomas Caramante in visiting his 12-year-old son, Thomas, Jr., one of the patients who participated in the research.

MGH News

Massachusetts General Hospital, Boston, Massachusetts

Vol. 43 No. 2 March, 1984

MGH Anticancer Campaign Shifts Into Higher Gear

Coping With the Threat of a Heart Attack

Robert Gonsalves of New Bedford was on the verge of a massive heart attack.

A major artery nourishing the workhorse of his heart, the left ventricle or pumping chamber, had so narrowed that only five percent of the vessel's diameter remained open.

"He probably suffered a very small heart attack before his arrival," said Dr. James C. McFarland of his 44-year-old patient, an officer at the Bristol County House of Correction in New Bedford. But the MGH cardiologist added, "By all criteria the treatment here prevented him from losing a great deal of additional heart muscle."

The measures taken during eight days of hospitalization dramatized some of the major advances in cardiology which have improved the outlook for heart disease patients over the last 15 years.

The techniques not only have minimized injury from heart attacks but have also prevented such seizures from happening in the first place.

Stricken periodically with a painful "gripping" sensation in his chest – like a fist being clenched – Mr. Gonsalves at first thought that he had developed some abdominal problem.

When he consulted a physician in Middleboro, near New Bedford, however, an electrocardiogram (EKG), which recorded the electrical activity of the heart, revealed cardiac abnormalities. The heart's inability to get enough blood to meet its needs produced the patient's discomfort, called angina pectoris.

The internist referred him to Dr. McFarland for further tests and treatment. Angiography, a special method of X-raying blood vessels, uncovered the arterial stricture.

Nitroglycerin, administered intravenously, helped to expand the vessel, enabling more blood to pass through and thereby somewhat relieving the angina. By giving the drug intravenously instead of orally, physicians can more closely regulate it and assess its effectiveness.

In addition to the use of nitroglycerin, a team in the MGH's Cardiac Catheterization Laboratory installed in the patient's main artery (aorta) a cardiac assist device developed jointly by the MGH and Avco-Everett Research Laboratory, Inc.

"The intra-aortic balloon pump is a superb instrument for stabilizing a heart patient," Dr. McFarland said. "It takes a great deal of the workload off the heart [*MGH News*, May 1971, and May 1980]."

(Continued on Page 2)

An accelerated radiation program directed by Dr. C.C. Wang has benefited many patients with head and neck tumors.

Fifteen years ago when the MGH announced plans to build a center for the treatment and study of cancer, the disease was taking the lives of 10,000 Massachusetts residents each year, and the toll was rising by two percent annually.

There was a clear need for a greatly expanded and truly coordinated oncology program at the MGH which would be based on the combined efforts of medical, surgical, and radiation cancer specialists in an optimum physical facility.

Completion in 1975 of the Cox Building to house the hospital's ambulatory cancer center came none too soon. One of every three Bay Staters requiring radiation treatment for cancer was receiving care at the MGH, a pioneer in radiation therapy. At that time, approximately 125 patients were being treated per day.

Today, the MGH Cancer Center is the largest in New England and has an extremely active radiation therapy program. During fiscal 1982–83, a total of 46,345 radiation treatments was performed. The only American center more active in this regard was the University of Texas M.D. Anderson Hospital and Tumor Institute in Houston. The MGH provides a far greater number of such treatments than any general hospital in the country.

The demand for the MGH Cancer Center services exerts heavy pressure on the Radiation Medicine Service. Although the new service was designed to accommodate up to 180 patients per day, this upper limit is regularly exceeded. For example, during a recent two-week period 205–221 patients were treated daily.

The number does not include treatments administered by the MGH staff to MGH patients at the Harvard Cyclotron and to patients at Mount Auburn Hospital in Cambridge, Mass., and Waltham Hospital in Waltham, Mass.

(Continued on Page 4)

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EDITORIAL:

A Collective Assault on Cancer

The MGH Cancer Center goes quietly about its business of treating cancer patients. Some leave cured. Some die, and others, as a result of their care, live meaningful, extended lives.

In the process, the Cancer Center sees a lot of patients. The caretakers realize that. What they did not know until recently is how the numbers compare with those of other medical centers. Now the cancer specialists do know. A page 1 article points out that the MGH ranks second in the country in volume of radiation therapy treatments, trailing only a Texas cancer specialty hospital. And the MGH Cancer Center treats more patients with malignancies than any other hospital in New England.

So what? That means that MGH cancer specialists have gained a tremendous amount of experience. As a referral cancer center, the MGH diagnoses and treats the rarest as well as the most common cancers. The oncologists publish guidelines for specialists in other hospitals. From this one cancer center comes the training of experts who provide treatment at institutions around the world. And the research performed here translates to lives saved everywhere.

The cancer caretakers perform their work in a variety of MGH buildings. Obviously one is the Cox Cancer Building which serves as the focal point. Yet many of the other 15 or so structures around the campus serve as the site of cancer-related activities. Little wonder, therefore, that the term MGH Cancer Center now applies to the entire geographic complex rather than the Cox Cancer Building alone. The achievements that come from the many walls help hasten the day when a number of the diseases collectively known as cancer will no longer serve to frighten people. That day can hardly arrive too soon.

Letter to the Editor

Dear Editor:

I enjoyed reading the article entitled, "Reviewing a Quarter Century at the MGH." I noticed in your article that you had omitted three names of physicians who are very important in the history of Massachusetts General Hospital and, in particular, in the Department of Oncology.

1. Dr. Ted Nathanson, who was responsible for a great deal of the oncology training and experience and the program. He was Dr. Rita Kelley's teacher and taught many others and also worked closely with Dr. Aub and Ben Castleman.

2. Dr. Grantley Taylor, who was the foremost pioneer in the development of head and neck surgery. As a result of his teaching, Memorial Hospital in New York began to do head and neck surgery.

3. Dr. Ernest Daland, who was the first chief at Pondville, and one of the pioneers in cancer surgery.

Sincerely,
Daniel M. Miller, MD, F.A.C.S.
Omaha, Nebraska

[EDITOR'S NOTE.] *Wish we had room to mention all the illustrious physicians who have so ably served the MGH through the period 1955 to 1980.*

New Heart Therapy Resolves a Crisis

(Continued from Page 1)

Physicians thread a 10-inch-long balloon into the aorta through an artery in the groin. Just before each heartbeat, the balloon deflates, thus lowering pressure within the aorta. This enables the heart's left ventricle to empty more easily into the vessel.

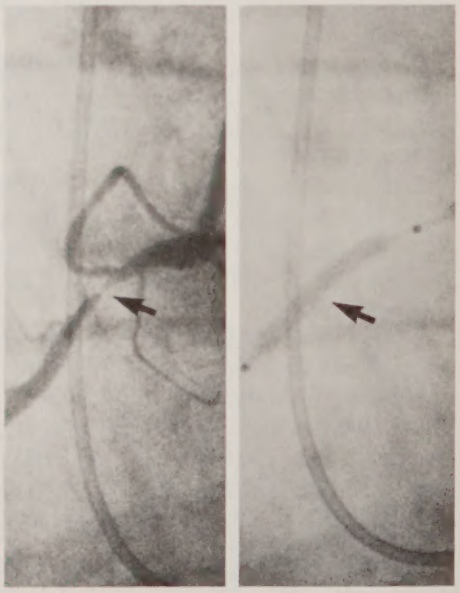
The pump, however, was designed only to tide a patient over until more definitive action can be mapped.

In determining the next step for Mr. Gonsalves, Dr. McFarland and other specialists consulted on whether to schedule bypass surgery that would detour blood around the arterial blockage or to employ a relatively new procedure called balloon angioplasty, which doctors can use in carefully selected patients to open up the obstruction.

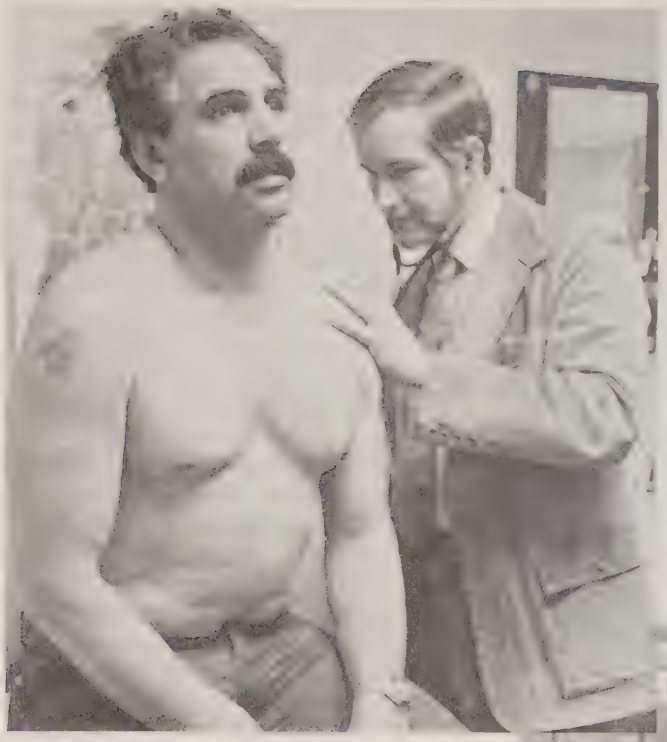
They decided on angioplasty. With a cardiac surgeon standing by in case immediate bypass surgery became necessary, Dr. Peter C. Block, Director of the Bulfinch One Catheterization Lab, fed a balloon-tipped catheter (tube) into the nearly blocked artery. Guided by fluoroscopy, which permits X-ray viewing of the moving catheter, Dr. Block threaded the tube to the blockage, then inflated the balloon to reopen the channel.

Dr. McFarland said the procedure reduced the obstruction from 95 percent to about 10 percent.

Contacted at his home several weeks later, Mr. Gonsalves said he had not



In these special X-ray pictures (angiograms) of a coronary artery, the arrows point (at left) to an abnormal narrowing of the vessel and (at right) to a balloon reopening the artery.



Dr. James McFarland examines Robert Gonsalves whose timely treatment at the MGH averted a massive heart attack. Photo below shows Mr. Gonsalves during earlier days as a horse trainer.

suffered any chest pain since his treatment at the MGH. He has stopped smoking and is paying more attention to his diet with the hope of avoiding future heart problems.

While Mr. Gonsalves' experience illustrates some of the emergency measures that can be taken for the heart patient, many other such patients can find adequate relief in medications alone if they seek help promptly.

"Ninety-five percent of heart attacks are related to coronary artery disease," said Dr. Adolph M. Hutter, Jr., Director of the MGH Phillips House Coronary Care Unit, "and in the vast majority of individuals with such disease, angina serves as a warning that an attack may be near."

He said that three classes of drugs – beta-blocking agents, nitrates, and calcium blockers – have proved particularly helpful in relieving symptoms.

"I would say that the beta blockers are the mainstay for long-term treatment," he stated. "They have a combined effect. They slow the heart rate, lower blood pressure, and decrease the force with which the heart contracts. The heart, therefore, consumes less oxygen and imposes fewer demands on the coronary circulation."

Nitrates dilate the coronary arteries and also the peripheral veins causing a reduction in the amount of blood returned to the heart. By decreasing the volume of blood that the heart has to pump, the drug reduces the burden upon the organ. In addition, nitrates often relieve a spasm that may occur in a coronary artery.

Calcium blockers decrease the work of the heart by dilating the peripheral arteries and reducing blood pressure. They are also effective against coronary artery spasm.

"A patient with progressive unstable angina should be hospitalized and treated promptly with beta blockers and nitrates," said Dr. Hutter. "Many cardiologists recommend that calcium blockers also be added as part of the initial therapy."

When a heart attack strikes, the cause in 80 percent of such patients is a blood clot in a coronary artery. And this is where still another drug plays an important role.

Physicians at the MGH frequently turn to streptokinase to dissolve a clot in a blocked artery. They can give the drug intravenously or deliver it to the clot through a catheter placed in the vessel containing the clot. Studies are under way to determine which method is more effective.

"In any case, streptokinase must be given during the first six hours after a heart attack to be effective," said Dr. Hutter. "The earlier it is administered the better."

He added, however, that in dissolving a clot streptokinase can cause bloodclotting abnormalities throughout the body. As a consequence, strict criteria govern its use. The presence of a bleeding disorder or a chest injury, as might be caused by efforts to resuscitate the patient, might prompt doctors to rule out streptokinase.

Currently under study is another drug, an enzyme like streptokinase, which does not appear to have the objectionable features of the sister agent. Called tissue plasminogen activator (TPA), the new drug seems to work on the clot alone without creating problems elsewhere in the body.

Commenting on animal trials with TPA conducted in association with Dr. Robert C. Leinbach and other MGH colleagues, Dr. Herman K. Gold said, "There is no doubt that this drug has enormous potential."

For years, physicians have debated the relative merits of intensive medical treatment versus heart bypass surgery to relieve unstable angina.

Dr. Hutter, who is also Associate Professor of Medicine at Harvard Medical School, points to a nationwide study in which seven university centers, including the MGH, participated in the mid 1970s: "We showed in a randomized study involving 148 patients that the results of medical treatment for angina are just as good as those of surgery in the acute setting."

He added that patients who undergo surgery for angina after first trying medical treatment are at no higher risk than those who have surgery first.

"The general feeling is that we should move in a stepwise fashion, trying first to quiet things down," he said. "The general indications for an operation are intractable angina and certain anatomical situations."

Also, balloon angioplasty, which helped Robert Gonsalves, the patient from New Bedford, is not for everyone. If a patient has multiple blockages in an artery, physicians would probably opt for an operation.

Dr. Hutter stressed the importance of early evaluation when a bothersome chest pressure develops.

"Many people have the misconception that angina has to be a pain," he said. "It can be a sense of heaviness, a constriction, a tightness in the chest, usually beneath the breastbone. It may radiate down the left arm or upward to the jaw.

"Angina is classically brought on by exertion and relieved by rest, but it can occur during rest. Prompt medical attention can often stave off a heart attack." ■

Photographs: Pages 1, 3 (upper), 5, 6, 8, Myron Daniels; p. 2, courtesy of Dr. Peter Block; p. 3 (lower), June Fallow; p. 4, David Ludlow; p. 7, courtesy of Pfizer Laboratories, Inc.
Drawing: Page 7, MGH Medical Art

Dr. William Wood, Medical Director of the MGH Cancer Center, with a patient

Cancer Specialists Serve Hospital-Wide

(Continued from Page 1)

The Radiation Medicine Service is equipped with two Cobalt-60 therapy units, two 18-million electron volt (MeV) linear accelerators, and a 35-MeV linear accelerator. Even so, some of the units are regularly operating 9–10 hours per day.

Dr. Herman D. Suit, Chief of the Service and also Chairman of the Harvard Medical School Department of Radiation Therapy at the MGH, said the hospital plans to add a 4-MeV linear accelerator to its present equipment. This would enable his staff to treat comfortably between 200 and 210 patients per day.

"We need the new machine," he stated, "because of an enormous increase in patients with carcinomas of the head and neck as well as of the breast which we have experienced.

"The 4-MV energy range is the most appropriate range for these two anatomic sites. To provide really modern treatment, one must have an array of beam energies and beam characteristics which we fortunately have. Our need now is to expand our capability in the lower energy range."

The medical oncologists (chemotherapists) record close to 30,000 ambulatory visits from cancer patients each year, and of more than 25,000 operations performed at the hospital annually, between one-quarter and one-third are for cancer.

Medical, surgical, and radiation oncologists work hand in hand in order that the best management strategy for each patient be developed and implemented.

Dr. Thomas P. Stossel, Chief of the Hematology–Oncology Unit, heads a staff of 17 specialists who treat cancer conditions ranging from blood malignancies, such as leukemias, to solid tumors, e.g., tumors of the breast, colon, lung, etc.

"For certain diseases, the medical oncologist will see a patient prior to radiation therapy or surgery to give drugs that will reduce a tumor mass and make it more treatable by the other modality," Dr. Stossel said.

"Also, after radiation or surgery, the oncologist may treat a patient to eradicate small nests of tumor which may persist."

He said that throughout the country drug treatment for leukemia, lymphoma, and testicular cancer and adjuvant chemotherapy for breast cancer (giving drugs after surgery to prevent recurrence of tumor) have been spectacularly successful.

For over 10 years, Dr. Robert W. Carey has directed an MGH affiliation with a national cooperative group sponsored by the National Cancer Institute. The group makes available to MGH oncologists the most up-to-date chemotherapy drugs and experimental treatments. The large number of institutions enrolled in the group also allows the results of experimental treatment to be evaluated rapidly.

Drs. Sigmund A. Weitzman and Philip C. Amrein of the MGH have developed a promising combination of medicines for treating head and neck cancers. At the same time, in radiation medicine, Dr. C. C. Wang has supervised the treatment of more than 500 such patients in an accelerated radiation therapy program.

"Dr. Wang has been investigating the value of treatments twice a day, instead of once a day, and shortening the overall time appreciably," Dr. Suit said. "He has had some spectacular results in treating tumors at several sites in the mouth and throat."

Dr. William C. Wood, Co-Chief of the Surgical Oncology Unit with Dr. Alfred M. Cohen and Medical Director of the MGH Cancer Center, said many patients suffering from certain cancers called soft tissue sarcomas have made dramatic recoveries as a result of radiation treatment followed by surgery.

"Previously," Dr. Wood said, "many of these patients would have faced radical amputation procedures."

Soft tissue sarcomas arise most often in the extremities. The preoperative radiation program extends over five and a half weeks and is followed by a two- to three-week rest period, then surgery (*MGH News*, October 1981).

The preoperative radiation not only shrinks a large cancer but also eliminates any microscopic extensions of the growth. The chances for a good surgical outcome thus are increased.

Dr. Wood spoke of another technique, the administering of high doses of radiation directly to a tumor site exposed during surgery.

"Intraoperative radiation," he said, "has been particularly important in treating advanced tumors of the rectum and pancreas. As we learn more about what can be accomplished, we expect the procedure will be applied to a variety of cancers."

Survival rates for patients with advanced tumors who received intraoperative radiation correspond to rates obtained with traditional methods in treating patients with early, easily removable cancers.

Dr. Wood described rehabilitation and reconstruction as important elements in the complete care of cancer patients. "The Plastic and Reconstructive Surgery Department, headed by Dr. James May," he said, "gives leadership to helping make patients whole again after the ravages of certain tumors, particularly those of the head and neck, and breast."

Surgeons at the MGH-affiliated Massachusetts Eye and Ear Infirmary (M.E.E.I.) collaborate with Dr. Suit's Radiation Medicine Service in the care of patients suffering from cancer in an outer layer of the eye (choroidal melanoma) (*MGH News*, March 1982).

Given by an MGH–M.E.E.I. physician–physicist team in collaboration with the Harvard University Cyclotron Laboratory, the treatment involves the use of proton beams. Unlike X rays which are waves of

electromagnetic energy, protons are positively charged particles (nucleus of hydrogen atom); these have a finite range. Because of an elegant treatment planning program developed by the MGH's Dr. Michael Goitein, these tumors can be treated with unprecedented accuracy in conscious patients.

More than 400 MGH–M.E.E.I. patients have received proton beam therapy for the eye condition. The results are described as highly satisfactory: only 2 failures to control tumors and a total of 6 eyes lost.

Doctors also report encouraging results in using proton beams to treat a smaller number of patients afflicted with sarcomas of the base of the skull and upper cervical spine. These tumors are usually not resectable, and they abut upon very sensitive structures of the central nervous system.

Dr. Cohen, Co-Chief of Surgical Oncology, has reported significant progress in fighting cancer of the liver by giving chemotherapy directly into the organ.

He and his staff have implanted more than 150 pumps in patients to deliver a combination of three drugs to the liver. By giving chemotherapy directly to the organ rather than systemically or intravenously, fewer side effects occur, and more of the medication reaches the target.

The treatment relieves rather than cures, but the effect is often dramatic. Dr. Cohen told of a man in his late 50s who was thought to have only three months to live. A tumor had replaced more than half of his liver.

After the patient started the new drug regimen via the implanted pump, his liver showed vast improvement. He lived another year and a half and felt perfectly well during most of that extended period.

"Because of the trial nature of this treatment, we've limited ourselves to patients with advanced liver cancers," said Dr. Cohen. "But in a large majority of these individuals, we've been able to achieve either regression or stabilization of the tumor."

Since 1971, Dr. Henry J. Mankin, Chief of the MGH Orthopaedic Service, has waged an anticancer battle which has attracted international medical attention. He and his colleagues have performed 221 bone transplantations, replacing a cancerous arm or leg bone with a corresponding part from someone who had died (*MGH News,* January–February 1981).

In the MGH Cancer Center and throughout the hospital, many researchers are trying to learn more about cancer and how to deal with it.

The series enjoys an overall success rate of better than 80 percent. In part, this is due to the ability of Dr. Mankin and his staff to preserve the viability of cells in cartilage attached to the donor bone (allograft) while it is stored in a bone bank at the MGH.

Dr. Mankin has conducted transplantations on many foreign patients, which makes follow-up difficult, but the doctor said, "I have actually had occasion to make house calls in such countries as Italy, France, and Greece."

The concept of a multidisciplinary approach in planning and delivering treatment for cancer dates as far back as 1925 when the MGH opened the nation's first tumor clinic within a general hospital.

The number of patients seeking clinic attention has so expanded that now many are seen in subspecialty clinics. The Pigmented Lesion Clinic, for example, is composed of dermatologists, pathologists, and surgeons with a particular interest in melanoma, a serious form of skin cancer.

"The clinic evaluates melanoma patients in consultation for the entire New England area," said Dr. Wood, the Cancer Center Medical Director. "We also have a collaborative program with New York University that includes one of the largest series of prospectively followed and carefully analyzed melanoma patients in the country."

The MGH maintains a computerized system for following cancer patients treated at the hospital. Listing more than 43,000 case histories, the Tumor Registry is the largest patient database in the MGH.

In the MGH Cancer Center and throughout the hospital, many researchers are trying to learn more about cancer and how to deal with it.

A team working under Dr. Stossel in the Hematology–Oncology Unit has made important contributions to the understanding of how cells move. "The same mechanisms governing movement are involved to some extent in the way that cells divide, which is an important feature of cancer," Dr. Stossel stated.

Under a grant from the American Cancer Society, the unit also is investigating the actions of certain white blood cells, called phagocytes, which normally fight disease.

Phagocytes react with oxygen to produce toxic chemicals which kill bacteria and other foreign invaders, but investigators suspect that an overabundance of toxic chemicals could damage tissue and make it more susceptible to cancer.

Dr. George R. Prout, Jr., MGH Chief of Urology, serves as chairman of a national collaborative group seeking to improve the care of patients with bladder cancer, which strikes 30,000 Americans each year. He also heads an MGH team studying how testicular cancer spreads. Through this, certain patients will receive different forms of treatment.

In the Gastrointestinal Unit, researchers have carried out considerable work with the hope that a simple blood test may one day make possible the earlier detection of cancer. Studies have indicated that an association exists between a factor in blood and

(Concluded on Page 6)

Staff nurses Mary-Jean Conroy (left) and Ann McNamara bid goodbye to Mona Sorour, 19, a Cairo University student whose cancerous left thigh bone was replaced with the donated bone of someone who had died.

Working in special clothing and behind a curtain of filtered air extending across the front of this workbench, Biologist Robert Sedlacek of the MGH Cancer Center can transfer research mice to another cage without fear of contaminating himself or the study project.

Simple Device Protects Complex Studies

Without safeguards against contamination, most laboratory research would stand little chance to succeed.

A protected environment becomes especially vital when investigators work with animals.

Disease-causing microorganisms inadvertently growing in laboratories have on occasion wiped out projects representing millions of dollars in investment and many years of work.

To prevent such a disaster, scientists have relied on complex physical barriers such as doors, hallways, air locks, and air-flow systems.

Some years ago, Robert S. Sedlacek, an MGH Associate Biologist, devised an animal cage system which he said offered a highly protected microenvironment for laboratory rodents.

The system was simple, convenient, inexpensive, portable, and easily adapted to existing facilities. But the scientific community was initially unimpressed. With the attributes described, it felt, the method could not possibly work. It was just too good to be true.

Today, Mr. Sedlacek's MICRO-ISOLATOR System not only enjoys nationwide acceptance but also attracts considerable interest abroad. Repeat orders have come from as far as the People's Republic of China.

Responsible for the quality control of animal research in the MGH Radiation Medicine Service and the maintenance of mouse colonies numbering as many as 20,000 animals, Mr. Sedlacek said previous anticontaminant techniques were simply impractical. They were too complex, space-consuming, and costly.

"Also, if an organism invaded a barrier-type system," he said, "it would not be long before that organism would spread throughout the entire colony, regardless of its size.

"We wanted to put the barrier right at cage level so that if contaminated animals were accidentally introduced into a laboratory, the problem would be confined to the individual boxes involved."

What the MGH biologist did basically was pattern his mouse cage after a Petri dish, long used in laboratories to contain microorganisms such as bacteria, viruses, fungi, etc. A Petri dish is simply a shallow, transparent dish with an overhanging cover.

Mr. Sedlacek adapted a special, rigid, transparent filter to a plastic mouse cage 7½ inches wide, 11½ inches long, and 5 inches deep. The filter permits air through the top of the cage but keeps out dust particles which would be "taxis" for any circulating disease-causing agents.

Mice fall victim to a host of diseases, including Sendai (a parainfluenza) virus, salmonella bacteria, Pseudomonas bacterial infections, and several strains of hepatitis virus.

To transfer mice to another cage containing freshly sterilized water, food, and bedding, MGH technicians use a special laminar flow workbench, also devised by Mr. Sedlacek. Lab Products, Inc., of Maywood, N.J., manufactures both the workbench and the MICRO-ISOLATOR System.

In using the bench, the technicians operate behind a curtain of filtered air and wear special garb for added protection. They can wheel the 32-inch-wide workbench to any desired location.

The MICRO-ISOLATOR System and the workbench have proved so effective that some researchers have safely maintained immune-deficient nude mice, highly vulnerable to infection, in the same room as mice injected with various viruses.

At the end of an experiment, the animal remains as unaffected by unwanted germs as when the experiment began. ■

Cancer Center

(Concluded from Page 5)

various types of cancer.

The MGH has also remained active in probing the effects of DES (diethylstilbestrol), a drug which MGH gynecologists from the Vincent Memorial Hospital division and an MGH neurologist–epidemiologist in 1971 linked to a rare form of vaginal cancer in the female offspring of women who took the drug during pregnancy.

Under the supervision of the late Dr. Ann B. Barnes, an obstetrician and gynecologist at the Vincent, and Dr. Stanley J. Robboy, a pathologist, the MGH DESAD (DES-Adenosis) Project has closely monitored mothers and daughters exposed to the drug.

Once a month, the Cancer Center holds a meeting (Grand Rounds) at which cancer specialists from throughout the hospital can keep abreast of activities in the field.

"There are so many different groups carrying out cancer studies at the MGH," explained Dr. Wood, "that we were concerned people might some day read about exciting research in a journal only to learn it had been carried out right down the hall. Although these meetings began relatively recently, we have already heard about new collaborations and cooperation among various labs and investigators." ■

On Giving Up Your Gallbladder

Only a few years ago, most doctors felt that the presence of stones in a gallbladder justified taking out that organ, even if the stones were causing no symptoms.

Since the gallbladder is not essential to good health and can be surgically removed with minimal risk, the argument went, why expose oneself to possible future problems?

Recent studies, however, have altered that attitude. They have shown that only about 20 percent of patients with symptomless stones will ever develop problems from them.

"Furthermore, with rare exceptions, the first sign of trouble in that group will not be a catastrophic illness necessitating an emergency operation," said Dr. Robert H. Schapiro, an MGH Physician and gastrointestinal specialist. "Usually there is ample warning when a need arises for intervention."

Rethinking their almost blanket philosophy of the past, doctors are much more selective today about gallbladder removals.

Nevertheless, these operations, called cholecystectomies, remain among the most common of hospital surgical procedures. At the MGH, three or four patients a day undergo this surgery. The number far exceeds those having appendectomies.

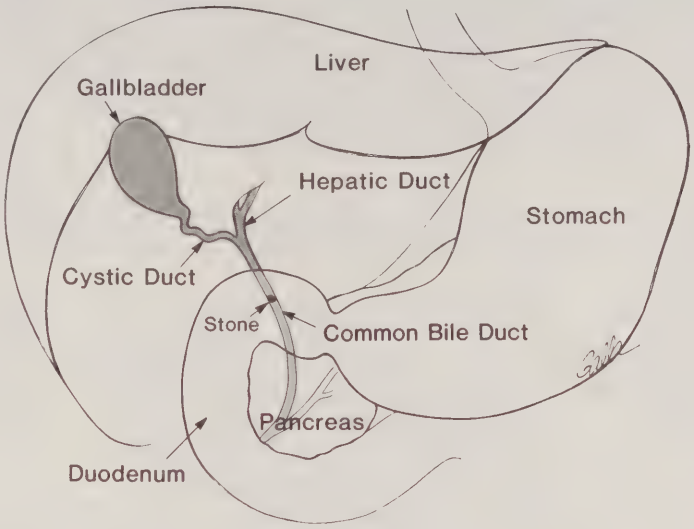
Physicians and surgeons still maintain that when gallstones *do* cause blockages, interfering with the flow of bile to the small intestine to serve as a digestive aid, both the stones and the gallbladder should be taken out; otherwise the trouble is likely to recur.

Since more than 15-million Americans have gallstones, and doctors diagnose an additional 800,000 new patients each year, the frequent need for cholecystectomies becomes understandable.

Attached to the undersurface of the liver, the gallbladder, a pear-shaped sac about four inches long, stores bile produced in the liver. The greenish-yellow liquid reaches its storehouse through a tube known as the hepatic duct and then through a side branch known as the cystic duct.

When a person eats, a hormone stimulates the gallbladder to contract. This ejects bile back through the cystic duct, but this time to the common bile duct which carries the fluid down to the duodenum, the first part of the small intestine. There, the bile mixes with digestive juices from the pancreas. Without bile, most fat consumed would remain undigested.

Bile contains cholesterol, bile salts (detergents), certain fats called phospholipids, and bile pigments, including bilirubin, a waste product that develops when the liver breaks down hemoglobin from destroyed red blood cells.



This sketch shows the gallbladder attached to the underside of the liver, the ducts through which bile is excreted, and how a stone can become trapped in the common duct, interrupting bile flow.

The vast majority of gallstones consist primarily of cholesterol, and the remainder are made of bilirubin.

For a number of years, researchers have tried to dissolve cholesterol stones by adding to the diet extra bile salts in the form of chenodeoxycholic acid.

"The drug did work but only in a minority of the cases," said Dr. Schapiro. "It took months, sometimes even a couple of years, for a gallstone to dissolve. If one gave too much of the chemical, the patient developed diarrhea. And it became clear that, to avoid recurrent stones, taking the drug would be a lifetime proposition."

Dr. Schapiro said a similar drug, ursodeoxycholic acid, seems to work a little better than its counterpart, but final trial results are not yet in. He added, however, that at best it won't be suitable for most patients with gallstones.

People ask, "If I lower the cholesterol in my diet, can I avoid gallstones?" The answer is that the cholesterol one excretes in the bile is not related very much to cholesterol in the diet, but gallstones are increased in obese patients and those with high caloric intake. Another important factor is the body's hormonal levels, particularly that of the female hormone, estrogen.

Genetic factors may also play a role. Dr. Schapiro, an Associate Professor of Medicine at Harvard Medical School, said that among many American Indian tribes the frequency of gallstones is incredibly high.

"Most of the women in these tribes, and many of the men, have gallstones by the time they reach 30," he said. "Among one group, the Pima Indians of southern Arizona and northern Mexico, 70 percent of the women have their gallbladder out because of symptomatic stones."

A gallbladder containing stones composed chiefly of cholesterol

Since it frequently occurs after a meal, an acute gallbladder attack might appear to be severe indigestion. But if the pain develops in the right, upper abdomen and goes straight through to the back or to the tip of the right shoulder blade, one should suspect the gallbladder.

Further clues pointing to the gallbladder include fever, chills, vomiting, and jaundice, a yellowing of the skin and eyes. Jaundice will occur if a stone blocks the common bile duct and causes bile to back up. The accumulation of bilirubin in the blood produces the yellow color.

A blockage of the cystic duct alone will

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New Technique for Withdrawing Gallstones

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not cause jaundice, but the stoppage could lead to an inflammation of the gallbladder (acute cholecystitis).

"An unremitting attack of that kind is the most absolute reason for taking out the gallbladder," said Dr. Andrew L. Warshaw, an MGH surgeon whose operating schedule includes at least two cholecystectomies a week.

"The gallbladder may not only become inflamed but also swollen and infected, and it may go on to become gangrenous and perforate."

Sometimes when the gallbladder contracts, a stone will temporarily block the duct, falling away as the organ relaxes. Such obstructions produce pain (biliary colic) lasting anywhere from a few minutes to a few hours. Since the attack is likely to repeat itself, Dr. Warshaw regards the organ's removal as normally the only solution.

Surgery to remove these stones but not the gallbladder is sometimes justified, he said. Severe sickness from cholecystitis or some other malady could warrant minimizing immediate surgery. The surgeon could remove the stones under local anesthesia. Later, the gallbladder itself could be taken out when the patient is better.

"This is definitely a second-best tactic, and it is not frequently adopted," said Dr. Warshaw, who is also Associate Professor of Surgery at Harvard Medical School. "At the MGH, it would be difficult to find a patient who could not be safely operated on to remove the gallbladder. We have such excellent help from specialists that we are able to deal with almost any problem."

A procedure developed simultaneously in Germany and Japan about six years ago has won an important place in the treatment of gallbladder disorders.

Dr. Schapiro, who is Chief of the Gastrointestinal Endoscopy Unit at the MGH, said the new technique, called an endoscopic sphincterotomy, makes it possible without surgery to find and withdraw stones trapped in the common duct.

Three to five percent of patients who have their gallbladder taken out are later found to have a stone in their common duct. That used to mean a second operation. Today, with an endoscope, a lighted instrument extended through the mouth into the abdomen, a specialist can insert dye into the biliary tract and visualize any obstructions on an X-ray screen. The doctor can then slit open the valve at the lower end of the bile duct using a wire introduced through the endoscope. This will either free the stone, causing it to drop into the duodenum, or allow the doctor to snare the stone in a basket and draw it out.

Dr. Warshaw said the technique is useful for clearing the common bile duct in a patient who still has a gallbladder but is a poor surgical candidate.

Any blockage at the bottom of the common duct requires speedy intervention because both bile and pancreatic juices would be trapped. An inflammation of the pancreas because of the obstruction could be life-threatening.

For the average patient having his gallbladder removed, the surgery lasts under an hour, the risk is little more than that of the anesthesia itself, the hospitalization totals less than a week, and after a few weeks of convalescence the patient can resume full activities.

Is life any different without a gallbladder?

"Since bile tends to be a natural laxative and will be going directly from the liver to the small intestine, mild changes of bowel habits may occur," said Dr. Warshaw. "But the vast majority of patients will notice no difference." ■

Using an endoscope, a lighted device which permits viewing internally, Dr. Robert Schapiro can inject contrast material into a bile duct and then detect any irregularities on an X-ray screen.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 43 No. 3 April, 1984

Ambulatory Center Provides One-Stop Health Care

Can Personality Affect the Heart?

In the late 1950s a series of heart and psychiatric studies singled out a specific segment of the population as facing an increased risk of a heart attack.

The people were described as hard-driving, intensely competitive, impatient individuals who have difficulty relaxing. They were labeled as "Type-A personalities."

In carefully designed studies, investigators demonstrated that Type-As had two to four times the number of heart attacks than did so-called Type-Bs, people who tend to be more laid back and relaxed.

The findings withstood the test of time until in recent years researchers began to focus greater attention on the details of the phenomenon. One of the paradoxes is that although the ratio of Type-As to Type-Bs was once figured at 50–50, it is now pegged at 70–30 in this increasingly complex and challenging world. Nonetheless, the incidence of heart attacks has declined dramatically in the same interval.

These changes in the personality and the disease are altering their relationship. For instance, many large-scale studies no longer find a relationship between Type-A and coronary disease or else find a relationship for only one segment of the population, such as working women.

"The signal that served as a veritable beacon for so long has faded," said Dr. Joel E. Dimsdale, an MGH psychiatrist and Director of the hospital's Stress Physiology Laboratory. "We're striving to learn why, and we think that at least a partial explanation is emerging."

Type-A, he said, encompasses such an array of different behavioral patterns that the overall picture may not be the crucial one but may actually mask one or more key factors that do link this kind of personality with the risk of heart disease.

He said evidence is beginning to build that anger and hostility, and how they are experienced and expressed, may alone serve as a more meaningful indicator of heart disease risk. Some of that evidence has come from MGH studies.

One of the earliest studies that found no relationship between Type-A and coronary disease was conducted at the MGH. Drs. Dimsdale; Thomas P. Hackett, Chief of Psychiatry; Adolph M. Hutter, Jr., Director of the Phillips House Coronary Care Unit; and Peter C. Block, Director

(Continued on Page 2)

Special equipment (See circles.) recorded the physiologic reactions of MGH psychologist Arreed Barabasz during mock emergencies on an instrument-controlled flight in a Boeing 737 simulator.

(First of a series on ambulatory care)

Since becoming fully operational a year and a half ago, the MGH's new Ambulatory Care Center (A.C.C.) has given this phase of medicine a new image.

Most arriving outpatients no longer anticipate long waits for medical attention. The vast majority have appointments.

And no longer do they scurry to far-off corners of the hospital to obtain blood or urine tests, X rays, electrocardiograms, etc. All customary ancillary services are located in the nine-story brick structure.

By inaugurating one-stop medical care arranged by appointment, the hospital has reversed a long-standing attitude among some patients that the medical profession operates on a double standard – one brand of care for the poor, another for the well-to-do.

Improvements for patients have also translated into benefits for other hospital projects. The new A.C.C., which records an estimated 400,000 patient visits annually, has enabled the MGH to enhance the nation's largest ambulatory care training program for medical residents.

"Some 15 residents in primary care internal medicine devote 40 to 50 percent of their time to ambulatory medicine," said Dr. John D. Stoeckle, Chief of the Medical Clinics in the A.C.C.

"Drs. George Thibault, Director of Residency Training, and John Goodson, Curriculum Director of the Primary Care Program, modified the training and extended it to another 45 residents aiming for various specialties. They spend up to a quarter of their time in ambulatory care.

"All residents work closely with senior physicians in caring for ambulatory patients. Senior staff specialists and generalists review treatment of the residents' medical patients in daily outpatient rounds."

Dr. Stoeckle said the kind of practice

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EDITORIALS:

Would You Refuse a Free . . .

Would you refuse a free insurance policy that covers your car against loss from collision? Few people would. How about a free way to sharply reduce the chances of death from the most rapidly growing solid tumor known. In fact few people accept such a free preventive.

The tumor involved is testicular cancer. As a page 5 article notes, this cancer causes more deaths among young men than any other type of solid tumor. For most people early detection, though, makes this disease easily curable. Then why do people avoid the necessary 30-second a month self-inspection that would make testicular cancer curable? In part probably because of fear — fear of cancer. Recognizing that early detection leads typically to cure should eliminate fear. Perhaps the time it takes to self-inspect represents another constraint. Six minutes a year, maybe 6 hours a lifetime, represent a tiny enough investment. Perhaps the biggest problem is ignorance.

Years ago similar ignorance prevented women from examining their breasts. It took years of promotion to change this lack of knowledge. But long-term perseverance by the American Cancer Society and others ultimately wore down women's resistance to self-examination. Obviously the same sort of concerted effort needs to be made to educate men to testicular cancer. And profiting from the educational campaign against breast cancer should shorten the effort in behalf of men. The toll of 600 needless deaths that result to men each year is too high a price to pay for complacency. Life is a nice alternative.

A New Look at Competitive Personality

Eight years ago MGH physicians studied the behavioral patterns of a group of patients undergoing heart tests but failed to find evidence that the more competitive individuals were at greater risk of developing coronary artery disease than the less hard-driving ones. The results confounded the accepted thinking about "Type-A behavior." So the investigators carried out a second study. Same results.

Since then other scientists have been reporting similar findings. That leaves the issue of whether an aggressive nature by itself predisposes people to coronary artery problems. The complete answer will probably be a long time in coming.

MGH Heart Studies Supported a Change In Type-A Position

(Continued from Page 1)

of the Bulfinch-One Cardiac Catheterization Laboratory, teamed up in 1976 to study 109 heart patients.

The group included 99 men and 10 women whose average age was 49. All had been scheduled to undergo angiography, a special method of X ray which involves the use of contrast material in blood vessels to make them visible on a screen.

"We saw these patients prior to their angiography and assessed their Type-A behavior pattern," Dr. Dimsdale said. "Then we tried to see the extent to which the behavior pattern correlated with the actual amount of coronary artery disease. Some researchers had found a relationship in earlier studies. To our surprise, we found there was no relationship at all."

The investigators were so intrigued by the results that they spent another year looking at an additional 103 patients awaiting coronary angiography, but the findings echoed the first outcome.

Dr. Dimsdale said that during the past few years various centers have conducted more than a dozen angiographic studies and of those only three or four found any relationship between Type-A and vessel disease.

He suggested that one explanation for the radically changed results could be a "drift" in the interviewing of patients.

"If we listen to recorded interviews saved from the '60s," he said, "we quickly notice a difference from how things are done today."

Interviewers studying a patient's personality pattern initially paid a lot of attention to *what* the patient said. Today, the concentration is not so much on the content of responses but on *how* they are given.

"An individual can easily manipulate an answer, but it is much harder for him to mask style," Dr. Dimsdale stated. "The interviewer's task is to get the patient talking about what upsets him and in so doing reveal 'A' characteristics to the extent that he has them."

To accomplish this goal, the interviewer

Photographs: Page 1, courtesy of Dr. Arreed Barabasz; pp. 3, 4, 5, 8, Myron Daniels; p. 7, courtesy of Dr. Bertram Zarins

Drawing: Page 6, MGH Medical Art

Few incidents frazzle the nerves as quickly as being caught in a traffic slowdown when rushing to keep an appointment. . .

Evidence is building that anger and hostility, and how they are experienced and expressed, may alone serve as a meaningful indicator of heart disease risk.

might pose a question very slowly, even intentionally stammer at times. If the patient jumps in and completes the question to speed the proceedings along, his action indicates an underlying impatience.

When the patient touches on a frequent cause of irritation such as job pressure or standing in a long line, for example, the interviewer will pursue that area of discussion to develop a better sense of the patient's reaction.

Does the patient answer questions at a smooth pace or in a hard-hitting staccato manner? Such stylistic aspects are crucial to the final evaluation.

One of the reasons for altering a more traditional interviewing style was that certain personality dimensions, such as irritability and hostility, were difficult to elicit by self-report alone. A patient might not want to admit, even to himself, these characteristics.

Dr. Dimsdale recalled many patients who claimed repeatedly that they led easy-going life-styles, but when asked whether their wives had any complaints about them, the answer often was: "Oh, she's always after me to slow down."

"Frequently one has to push to ferret out the truth," said the MGH psychiatrist. "Sometimes we have blind spots about our own behavior."

Many people mistakingly attach a label of good or bad to personality patterns. "Actually, there are positive things to say about both Types A and B," Dr. Dimsdale stated.

"For example, although Type-As have great energy and drive, one cannot suggest that all corporate executives should be Type-As. At a certain level of administration someone has to sit back and be very patient, and Type-As don't do that very well."

When does Type-A manifest itself? Some investigators trace this to early childhood. Dr. Dimsdale believes that the interaction between environmental conditions and personality has a major impact.

"Some environments do foster an intense form of joyless striving, and yet individuals cope differently in the same setting," he said.

He thinks it would be painting with a very broad brush to say that Type-A behavior — that diffuse, ill-defined pattern that characterizes 70 percent of our population — accounts for heart attack risks.

"That does not seem to be a precise way of describing the complexities of either coronary artery disease or behavior," said Dr. Dimsdale, who is also Assistant Professor of Psychiatry at Harvard Medical School. "There is probably a subset of coronary disease where behavior is highly relevant. What precisely is toxic about the behavior, whether the key is anger, hostility, joyless striving, or something else, remains to be determined."

He thinks, however, that people might find it rewarding to consider their own behavior and whether they might be candidates for a Type-A classification.

They might ask themselves: How irritated and impatient do I get over minor inconveniences? How long does it take for me to regain my balance?

Dr. Dimsdale stated:

"There is a misconception about the role of behavior and coronary disease. The toll probably comes from the way we deal with the repeated mundane stresses, not the traumatic rare stresses.

"If such common events as waiting in a line or arriving at a bank a few moments too late upset a person so much that his heart races and his muscles tense, the physiology of that repetitive emotional arousal may well be one of the crucial links between the behavioral environment and the higher risk of developing cardiovascular disease." ■

. . . or hurrying to the bank only to find on arrival that it has just closed.

Making Ambulatory Care More Personal

(Continued from Page 1)

that physicians face in the future includes some hospital duty and a lot of ambulatory work. The Medical Service, he said, has converted residency training to reflect that. Around the country, that transformation has not generally taken place.

Group practices and clinics account for 70 percent of the activities in the A.C.C. One group of physicians may specialize in internal medicine; others in endocrinology, allergies, arthritis, or lung or kidney problems.

Each group has its own waiting area containing a dozen or so chairs, more than adequate for patients at any one time.

The personalized attention made possible by this setting closely parallels the care given by private practices situated close by and making up the remaining 30 percent of the A.C.C.'s operation.

Dr. Stoeckle, who is also Professor of Medicine at Harvard Medical School, said the setting provides limitless opportunities for collaborative work between residents and nurse practitioners, social workers, physician assistants, specialty consultants, and the senior staff, benefiting both patients and doctors alike.

A Medical Walk-In Unit on the first floor of the A.C.C. accommodates 21,000 patients a year, a quarter of them referred by the MGH Emergency Ward as needing convenient (but not emergency) treatment.

"You can compare what we see with what a family doctor would see in his office," said Dr. Richard G. Pingree, a senior staff member who is the unit's Director. His group, however, has encountered its share of the unusual.

He told of a man from Syria who suffered for two years from periodic attacks of severe abdominal pain which radiated up to his chest. He would develop a fever reaching 104°F, and it hurt if he took a deep breath. He had been to many doctors before coming to the Walk-In Unit, but no one could help.

"We diagnosed his condition as Familial Mediterranean Fever," Dr. Pingree stated. "We prescribed colchicine, a drug often used for gout [but shown several years ago by MGH doctors to be effective for Familial Mediterranean Fever]. The patient has been free of attacks since.

"A surprising thing is that I later described the man's plight to each of the physicians working here, and not one failed to come up with the right diagnosis."

Many lay people believe that medical walk-in units cater principally to the poor. "That has never been the case with us," said Dr. Pingree, who also headed the MGH unit's predecessor, the Ambulatory Screening Clinic, in the hospital's former Outpatient Department.

He said his staff treats many young professionals and students who are newly settled in the Boston area and have no private physician. Other patients arrive seeking second or third opinions about their medical status.

Sometimes, a physician, uncertain about a patient's condition, will advise, simply, "Go to the Mass. General."

When a patient appears at the Walk-In Unit obviously requiring specialized attention, the individual is immediately redirected to the proper location. It may be the Emergency Ward or a particular office in the Center.

The A.C.C. maintains on the third floor a Surgical Day Care Unit that far overshadows its predecessor which was situated on the 11th floor of the MGH's Baker Building.

With 10 operating rooms, the new Surgical Day Care Unit is considerably larger than the old, but the main advantage is a modern area totally capable of handling any type of ambulatory surgery.

Dr. Daniel L. Nozik, an anesthesiologist in the new unit, said that half the patients reporting to Baker–11 had to be rerouted to an inpatient operating room for their ambulatory procedure.

The Cabot Day Surgery Floor in the A.C.C. records about 8,000 procedures annually, up to 2,000 more than in the previous facility.

Urologic surgery and many gynecologic procedures are done routinely on A.C.C.–3 whereas the earlier custom called for an inpatient operating room.

Internal examinations using lighted instruments, such as an endoscope to look for a possible stomach ulcer or an arthroscope to view damage to joint cartilage, can be performed more safely in the

The MGH Medical Clinics (top photo) offer many phases of specialized care. At lower left, an ailment is diagnosed in the Walk-In Unit, and at lower right a patient, who has undergone physical therapy, tests the strength and endurance of his knee muscles.

Surgical Unit. Often, if the diagnosis calls for an operation, surgeons can carry it out right away.

Dr. Nozik said that approximately 75 or 80 percent of all pediatric operations at the MGH are conducted on an outpatient basis.

The fee to use an ambulatory care operating room is significantly less than that of an inpatient OR. Added to that is the saving realized by not having to remain overnight in the hospital.

To make medical care more accessible to its patients, avoiding disruption of family life and job routines, the MGH Dermatology Department expanded its ambulatory care services to include a Day Treatment Center and a Surgery Unit (*MGH News,* January–February 1984). Surgeons can now provide in this A.C.C. area many procedures formerly requiring hospitalization.

The concentration of many specialties in the A.C.C. has broadened opportunities for treating people with diverse needs. For example, even before the center became fully operational a unit was created there to study and treat memory disorders, a leading problem of the aging (*MGH News,* September 1983).

Directed by Dr. John H. Growdon, a neurologist, the Memory Disorders Unit makes it possible for a patient who may have Alzheimer's disease to receive the collaborative services of a neurologist, psychiatrist, speech pathologist, nurse, and a social worker.

With some 900 rooms consisting of offices, examination and conference quarters, a surgical center, radiological suites, two pharmacies, and physical and occupational therapy areas, the A.C.C. has taken a lot of pressure off the main hospital.

A shoulder operation employing arthroscopic techniques in the Surgical Day Care Unit

"Radiology has benefited extensively," said David M. Masters, MGH Director of Medical Support Services. "Since most ambulatory X-ray services have shifted to the A.C.C., older space has been freed for more specialized tests such as CBT [computed body tomography] scanning, neuroradiology, and nuclear medicine procedures."

Mr. Masters also pointed out that sections of the hospital's old Clinics Building are now occupied by the Medical Engineering Department and the Laboratory of Computer Science. This has permitted the hospital to convert to patient care previous quarters on the 12th and 13th floors of the Gray Building.

"Establishment of the A.C.C. fulfilled several dreams," said Myle J. Holley, Administrative Director of the Ambulatory Care Division. "They were achieved without creating a single, monolithic, centrally managed, multispecialty group practice.

"Instead, the Center represents essentially a collection of practices, each with its own style and each functioning under its own departmental jurisdiction."

The rapid expansion that marked ambulatory care during the 1970s has begun to level off, but Mr. Holley stated, "In Boston we continue to see an unmet demand for internists, orthopaedists, dermatologists, and cardiologists, among others. Even with the leveling off, there is room for a resumption of growth." ■

Guarding Against a Fast-Growing Cancer

Due to monthly self-examinations, more than 90 percent of women who develop breast cancer discover their own disease. Early detection provides doctors with the best hope for successful treatment.

In lectures he has given across the nation, Dr. George R. Prout, Jr., Chief of Urology at the MGH, has urged men to adopt the same kind of habit as that of women to detect a type of cancer which grows four times faster than breast cancer.

"Certain tumors that affect testicles are among the most rapidly doubling of all solid tumors known," Dr. Prout said in an interview. "A testicular cancer cell can become two cells in as few as 25 days.

"If a man calls our office and says, 'I have something wrong with one of my testicles,' the patient is seen that day, and if he won't come in that day, we certainly try to get him to come in the next day. Speed in making the diagnosis is so important."

Once a month after a shower or bath, Dr. Prout said, a man should hold his testicles in one hand and feel each gently with the other hand. If the examination reveals a hard mass inside a testicle, the person should consult a physician without delay.

Testicular cancer accounts for only 1 or 2 percent of male cancers, but it causes more deaths among men in their 20s and 30s than any other type of tumor. Detection and treatment often come too late.

A third of testicular tumors are "seminomas." Slow-growing and found most frequently in slightly older patients, seminomas respond well to radiation treatment. Of 44 seminoma patients treated at the MGH between 1970 and 1981, all but one survived.

The other growths, however, classed simply as "nonseminomas," usually spread very rapidly through vascular channels, blood or lymphatic (part of the immune system), and resist radiotherapy.

In a study entitled *Testicular Tumors: Delay in Diagnosis and Influence on Survival,* Dr. Prout and Pamela P. Griffin, RN, reported that of 38 nonseminoma patients who were treated at the MGH between 1970 and 1975, 12 later died after the disease spread. Only 4 of the 12 had sought care within a month of developing

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Loss of a Testicle Need Not Be Disabling

(Concluded from Page 5)

symptoms.

Among 51 nonseminoma patients treated with surgery and drugs (chemotherapy) between 1976 and 1981, the number of patients who died after delaying treatment again reached 8, but this time there were no deaths among patients who sought care promptly.

Dr. Prout said that in many instances nationally the responsibility for delays in treatment rests not with the patient but with his doctor. "Many physicians seem prone to want to make some diagnosis other than testicular cancer when confronted with a patient who has a mass in a testicle," the MGH urologist stated.

He attributed the reluctance to the fact that the key diagnostic test requires removal of the testicle for study under a microscope. Ninety-five percent of the time, the patient turns out to have testicular cancer.

"It is far more dangerous to hope that the patient doesn't have a testicular tumor and therefore not make the proper diagnosis," Dr. Prout said, "than to move promptly to make the right diagnosis by removing the testicle.

"Even if the patient is found not to have cancer, the mass in his testicle would have reduced its usefulness severely. Unless he had become impotent and sterile due to some other cause, the patient's remaining testicle would enable him to continue as sexually potent and fertile as before."

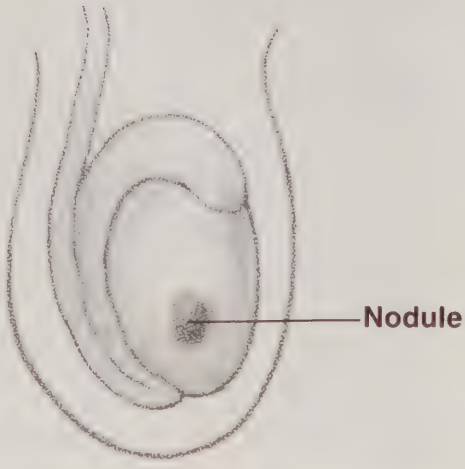
In diagnosing testicular cancer, the examining physician first obtains a "history" on the patient. Does the suspected testicle feel heavy to the individual? Is it painful? Has the patient experienced any change in facial hair growth, the size of his nipples, or his sex drive?

"If the patient's nipples have enlarged in addition to a mass developing in a testicle, the chance of the mass being a tumor is extremely high," said Dr. Prout, who is also Professor of Surgery at Harvard Medical School. "In addition, patients will often have a positive chest X ray."

When some doubt arises about the presence of a real growth in the testicle, an ultrasound examination is usually advised. "For many patients, it is practically diagnostic," the MGH specialist stated.

Frequently, however, physicians investigating a testicular lump or swelling tend to suspect epididymitis, an inflammation of a tubular structure which surrounds each testicle and serves as a storehouse for sperm cells. Ultrasound might be less helpful in this situation.

Antibiotics coupled with bed rest would greatly reduce any swelling and tenderness caused by epididymitis as well as any fever brought on by infection.



Delay in seeking medical care following discovery of a lump or swelling in a testicle, such as shown here, can be fatal.

Dr. Prout cautioned that if the patient failed to respond to conventional antibiotic care and rest by the end of three weeks, the mass should be considered malignant.

Laboratory tests can support such a diagnosis. Nonseminomas produce certain so-called markers in the blood. One is called human chorionic gonadotropin. Another, alfa-fetoprotein. The presence of either in a person with a testicular abnormality would indicate the development of cancer cells in the body.

"Certain tumors that affect testicles are among the most rapidly doubling of all solid tumors."

— Dr. Prout

Absence of the chemical markers does not necessarily rule out cancer. A physician may diagnose the condition as cancerous on the basis of other signs or symptoms and therefore recommend surgery to take out the testicle (orchiectomy). The operation is performed through an incision in the groin.

Blood specimens examined after the surgery could indicate that the disease had already spread (metastasized). Potent drugs given to halt the proliferation sometimes produce side effects such as nausea, diarrhea, or itching, but these disappear on discontinuance of the medication.

If a physician upon diagnosing cancer notices that the cells already have spread to abdominal lymph nodes, he may decide to reverse the customary order of treatment. He may prescribe chemotherapy first to check the spread and then remove the tumor.

The cause of testicular cancer is unknown. "The disease does not result from anything we ingest, or inhale, or which influences our growth in any way," Dr. Prout said. "Rather, it is apparently some defect that arises long before birth."

No one knows whether testicular cancer is familial, but there have been instances of twins with the disease. Dr. Prout said that this tends to support a theory of something being wrong with so-called primordial cells which provide the earliest discernible indication of an organ or part during embryonic development. If the theory were correct and a twin developed cancer, one might expect the second to have the disease as well.

Researchers have looked into the possibility that DES (diethylstilbestrol) taken by pregnant women some years ago to prevent miscarriage led to testicular cancer in some male offspring. The concern of investigators arose because a tiny percentage of exposed female offspring has developed vaginal or cervical cancer.

"That worry about males has turned out not to be true," said Dr. Prout. "Investigators found an increased incidence of epididymal cysts and some other abnormalities involving the genitalia but apparently not testicular cancer."

A number of mysteries surround the disease. No one can explain, for example, why testicular cancer rarely occurs among blacks. Why also is the rate higher in some countries, such as the United States, England, and Denmark, than in other nations? And why do more people of higher social status seem to get the cancer than others?

Regardless of the enigmas, the fight against testicular cancer is making significant progress. The death rate from the disease fell from 31 percent in the early 1970s to 15 percent in the second half of the decade.

"There is every reason to expect the survival rate to climb in the near future to 90 percent and perhaps even higher for all testicular cancers," said Dr. Prout. But he added:

"This will remain only a medical possibility if people who have something wrong with a testicle put their heads into the sand and fail to see a physician promptly." ■

America's Olympians Boast Clean Record At Sarajevo Games

The Americans who participated this year in the XIV Winter Olympic Games at Sarajevo, Yugoslavia, not only brought home four gold and four silver medals but also an unblemished record of competition.

Not a single instance of illegal drug use was reported among the 126 American athletes.

Because of occasional incidents of drug-taking to improve performance at previous games, the International Olympic Committee (I.O.C.) enforced rigid standards at Sarajevo. Its list of banned substances included many drugs available in over-the-counter remedies commonly used in American homes.

Dr. Bertram Zarins, an MGH orthopaedic surgeon, was head physician of the United States Olympic team. He said his group's biggest concern was not the deliberate taking of drugs but the possible accidental use of a prohibited substance.

An athlete with a cold and a headachy feeling, for example, could safely take Tylenol but not Co-Tylenol because it contains codeine, Dr. Zarins explained. Similarly, Afrin, a nasal decongestant, was authorized while another decongestant, Afrinol, containing the stimulant pseudoephedrine, was not. In regular form, Robitussin, for coughs, was legal, but Robitussin-DM, which has a codeine-type ingredient, appeared on the banned list.

"We took extra special precautions to prevent inadvertent violations," said Dr. Zarins, who is also Chief of the Sports Medicine Unit in the MGH Orthopaedic Service, head physician for the New England Patriots football team, and orthopedist for the Boston Bruins hockey team.

Tests in this doping control station verified compliance by athletes with Olympic rules against the use of certain drugs.

"We gave lectures and distributed printed materials to the athletes to make sure they were fully aware of the strict I.O.C. rules. We even had warning stickers pasted on bathroom mirrors.

"One of the American teams arrived at the Olympic Village with a kit containing a number of medications. Somebody had checked the contents of the kit earlier and had given an okay on the medicines. When we went through the bag, however, we found two drugs that are banned."

The I.O.C. regulations usually provided for doping control of first-, second-, and third-place finishers in individual competitions, plus two other participants randomly chosen in each event. In a team sport, two players from each team usually were tested following a game. In each case, a team physician or trainer accompanied the selected athlete from the competition to the doping control station.

The special equipment used for the chemical tests can detect even a minute quantity of a drug. It made no difference if only a tiny amount was present. A positive finding was sufficient under the rules to strip someone of a medal.

There were two exceptions, however. If the concentration of caffeine in an athlete's urine was measured to be under 15 micrograms per milliliter, he was safe. But he had to be careful. Suppose the individual consumed two cups of coffee (accounting for 3–6 mcg/ml), later two colas, then a No-Doz tablet to stay alert, and still afterward one of the popular APC (aspirin, phenacetin, caffeine) remedies for a headache. Since each item contains caffeine, the athlete could easily exceed the allowable limit.

Another test conducted on a quantitative rather than qualitative basis involved the natural male sex hormone testosterone. "People conniving for a possible edge in an event know that steroids are banned and that they would be caught if they used them, so they try testosterone as a substitute," Dr. Zarins said.

This year's Olympic Games were the first at which caffeine and testosterone came under close scrutiny.

Most Olympic delegations brought their own medical care. Serving under Dr. Zarins in the United States medical contingent were a second orthopaedic surgeon, two family practitioners, and

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Since most Yugoslavians smoke, America's athletes posted this sign in their dormitory lounge . . . with limited success.

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Olympic Skier Recovering After Mishap

(Concluded from Page 7)

four athletic trainers.

Yugoslavian authorities provided medical facilities at the site of each major competition. Any delegation was welcome to enlist the services of Yugoslavian doctors and nurses. The American health group used the facilities for several X rays, electrocardiograms, and laboratory tests.

"We treated approximately 20 athletes a day in our medical clinic," Dr. Zarins said. "Many needed physiotherapy-type treatments such as stretching and massage or reported for follow-up care of previously treated illnesses or injuries.

"Out of 133 initial encounters, 48 were for orthopaedic problems, and 85 were of a general medical nature. Most injuries were in hockey. Two players suffered lacerations that needed suturing, and several other skaters incurred contusions, but none of the problems was major.

"We treated many upper respiratory infections, which are common in the winter. However, they did not prevent anyone from competing."

One spectacular accident involving an American occurred during the Olympics. In full view of millions of spectators attending the games or watching on television, a 25-year-old skier from Weston, Mass., took a frightening tumble during a 90-meter jump.

A helicopter rushed Matt Petri to Sarajevo's University Hospital with torn tendons and muscles in his left forearm and a four-by-three inch area of skin loss.

Dr. Zarins assisted a Yugoslavian surgeon in giving care at the hospital, including transfer of a skin graft from the patient's thigh to cover his arm wound.

Because of the extent of the injury, the doctors did not attempt immediate repair of the muscles and tendons. When Mr. Petri returned home, Dr. Zarins referred him for further treatment to Dr. Richard J. Smith, Chief of the Hand Surgery Service in the MGH Department of Orthopaedics.

Dr. Smith said the muscles torn are used normally to flex the wrist and control finger movement.

"Matt is getting occupational therapy on an ambulatory basis to try to stretch the muscles," he said. "As for the tendons, one was important but was torn at the point where it attached to a muscle. If in several months Matt appears to be facing a wrist disability due to weakness of that muscle, we may have to reoperate to reconnect the tendon."

Under the guidance of MGH Occupational Therapist Colleen Tinel, Olympic skier Matt Petri uses modeling clay to strengthen injured muscles in his left hand and forearm.

Although he considers the quality of Yugoslavian medical care as good, Dr. Zarins said ambulance crews in Sarajevo were not trained to administer emergency treatment. As for the ambulances, they were a van or station wagon, used simply for transportation.

At the hospital, however, the staff's precautions to maintain a sterile environment impressed Dr. Zarins. "Whenever they changed a dressing, the doctors and nurses donned caps and masks," he said. "And they never wheeled a patient on a stretcher from his floor directly to the operating room. Instead, the patient was transferred outside the surgical suite onto an OR stretcher."

Many of the physicians at the hospital spoke English. The doctor who operated on Matt Petri was the center's Chief of Plastic Surgery. He had undergone two years of training in the United States in his specialty.

Despite the dedication of Yugoslavian health personnel, when the XIV Winter Olympic Games ended and Dr. Zarins returned from what had been a 3½-week stay in the communist-ruled nation, he felt he had left behind a real health problem.

"One of the things that struck me most about Yugoslavia was that it seemed everybody smoked," said the doctor, who is also Assistant Clinical Professor of Orthopaedic Surgery at Harvard Medical School.

"Almost everywhere you went, you saw people smoking. Every motorist seemed to be holding or puffing on a cigarette. People smoked in public conveyances, in elevators, and in restaurants. You would sit down to a meal and soon feel your eyes tearing.

"The American athletes were so concerned that they put up a sign in the lobby of their dormitory, appealing to visitors not to smoke."

Dr. Zarins snapped a picture of the sign. In front of it was a receptionist, a cigarette dangling from her mouth. ■

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 43 No. 4 May, 1984

A Disabling Disease Which Mimics Other Illnesses

Logan Medical Unit Joins in the Growth Of Boston's Airport

(*Second article on ambulatory care*)

The MGH–Logan Airport Medical Station in East Boston has expanded health services for the thousands who each day work at or visit the world's 15th busiest airport.

Ranging from highly coordinated emergency response procedures to aggressive measures for assuring safety at the workplace, the programs represent an intensified effort to keep pace with the ever increasing growth and needs of the Massachusetts Port Authority.

Since its founding 21 years ago, the medical station has seen the work force at the airport rise to 13,000 and the number of departing and arriving air passengers soar to 50,000 per day. Friends and relatives visiting Logan conservatively account for double the toll of passengers.

The station, which has an overall medical staff of four physicians working half time, five nurses, and an X-ray technician, serves basically as a walk-in health center. The staff treats the usual range of aches, pains, and injuries, administers physicals for flight certification, provides immunization for world travel, and cares for sick air passengers awaiting a change of flights.

But the list of responsibilities goes on:

"On average, two people a month suffer cardiac arrest at the airport," said Dr. Terrence A. O'Malley, Director of the medical station. "We play a key role in trying to save the person whose heart has stopped."

Emergency medical technicians (E.M.T.s) based at Logan Fire Headquarters respond first to such calls for assistance and, while en route, notify the MGH station, which sends out a physician and a nurse.

Air traffic controllers in the Logan Airport Tower alert nearby MGH medical station personnel when someone ill or injured is aboard an incoming flight.

"The E.M.T.s can usually reach the patient in two minutes to get basic life support started," said Dr. O'Malley. "We can get to most places in the airport within five minutes to begin advanced life support."

As work moves forward to keep open (intubate) the patient's airways, restore a heart rhythm, start the administration of intravenous (IV) fluids, and give medications through the IV lines, a highly trained team of paramedics from the

(Continued on Page 5)

Arthritis or arteritis . . .

To most people, arthritis is no stranger. If a person does not have the disease, he almost certainly knows someone who does.

Affecting nearly one of every four Americans, this connective tissue disorder involving joints causes more prolonged physical misery to more individuals than any other malady (*MGH News*, January–February 1978).

Few people, however, have heard of arteritis. A connective tissue disease like arthritis, arteritis sounds almost like a slip of the tongue but actually can be many times more insidious than its cousin.

In medical parlance, arteritis means inflammation of an artery. Any artery can be affected, from tiny ones called arterioles, which connect with capillaries, to medium-sized muscular arteries found in all parts of the body to elastic arteries which describe the major vessels like the aorta.

The symptoms of an arteritis attack depend on the vessel involved. Damage to a small artery might show up simply as discolorations under the skin caused by hemorrhaging into tissue. Inflammation of a larger vessel could interrupt the blood supply to a vital organ, incapacitating it. And if the inflammatory response strikes the aorta, the body's main artery, the result could range from a cramping in the arms to a stroke or heart attack.

Arthritis has often been labeled the nation's major crippler, but one would have to look far to find a disease capable of crippling faster than arteritis. Fortunately, it does not occur very often.

Dr. John A. Mills, MGH Physician and Chief of the hospital's Esther Hewes Arthritis Clinic, described giant cell arteritis as the most common form of the

(Continued on Page 2)

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EDITORIALS:

Keeping up with the Times

Nothing changes more rapidly than medicine. The field's knowledge explosion often makes yesterday's information obsolete. In some specialties even experts have difficulty keeping up. Genetics and immunology are but two examples. Yet if a physician fails to absorb the latest knowledge, he fast becomes a relic, one of ever decreasing help to patients.

How does a physician manage to learn of the latest advances? One answer is medical journals. There are, however, thousands of journals circulating around the world. A physician who devotes 60 or more hours to caring for patients can scarcely read two or three journals a week. In fact what assurance do his patients have that he keeps up with any of the professional literature?

It was just that concern which comparatively recently led medicine to seek a way to determine whether a physician is remaining abreast of medical innovations. The article on page 4 of this issue describes requirements to earn credits, largely by attending lectures or taking courses.

The system is imperfect. A doctor could earn credits merely by attending informal lectures. In such cases there would be no way to determine whether the physician is absorbing or preoccupied. Nevertheless the belief is that most busy professionals who take time to attend a lecture in an area of interest will absorb a great deal. That is certainly true of the two New Hampshire doctors described in the article. Both have been attending medical lectures at the MGH from 20 to 25 years. For much of that period there were no requirements, merely interest. And for them attendance has meant considerably more effort than for the hundreds of MGH physicians who regularly attend lectures at the hospital. The New Hampshire doctors represent a spirit of learning that has made the medical profession so dedicated through the years.

The Rites of Spring

May is the first full month of spring, a time when dormant nature begins to stir. With the warm days of spring begins the annual rite of sunbathing, and like birds returning after the winter people flock from their homes to the beach to soak up the sun. As a page 7 article notes, the warm rays of the sun also carry some risks. Burns, premature aging, and even cancer are some of the hazards to the skin from over-zealous sunning. So enjoy, but do not overdo.

Deceptive Arteritis Can Cause Vision To Fail Suddenly

(Continued from Page 1)

disease. Affecting about 20 people per 100,000, usually beyond the age of 50, this affliction can without warning cause total, irreversible blindness in just 10 minutes!

"Coming on very suddenly, the disease affects primarily the arteries serving the head and neck," Dr. Mills said. "The patient may complain of a pounding ache in some part of the head, particularly the temple [the disease was once called temporal arteritis]. Sometimes, arteries in the jaw muscles will cause pain as a person chews."

Since the illness can easily be confused with a migraine headache or arthritis in the jaw, proper treatment may be delayed, thus allowing spread of the disease to arteries serving the eyes.

Dr. Mills told of an elderly woman who suffered a transient loss of vision in one eye. She went to a physician, but since her sight had returned, she was advised to come back the next day. By then it was too late. Some eight hours after the vision first failed, it was lost again. This time for good.

"If vision is lost in one eye, there is a 50–50 chance that sight in the other eye also will be affected within a few days," the doctor warned. "This underscores the need for speed in diagnosing the condition and beginning treatment."

As the name giant cell arteritis implies, giant cells that occur in areas of inflammation serve as markers for the illness. A pathologist examining a snippet of biopsied tissue from a blood vessel wall would spot not only a lot of inflammation but also the telltale large cells with multiple nuclei.

Prednisone, a synthetic cortisone, is particularly effective in controlling the disease. After six months to a year of treatment, the disorder seems to run its course in most instances. A few patients do require ongoing care.

By putting a quantity of blood and an anticoagulant into a glass tube and measuring the settling rate of the red cells, a physician can determine precisely

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Photographs: Pages 1, 5 (upper), 6, Robert Tonner; p. 3, courtesy of Dr. John Mills; pp. 4, 5 (lower), Myron Daniels; pp. 7, 8, Dr. Madhu Pathak

Drawings: Page 7, Robert Galla, MGH Medical Art

how much medicine to give the patient.

"Since those likely to be affected are in the older age population, it is critically important not to overprescribe prednisone," Dr. Mills cautioned. "When overused, the drug can soften bones, causing osteoporosis and increased susceptibility to fractures."

Periarteritis nodosa, a form of arteritis which erupts primarily in large muscular arteries, also causes consternation among physicians.

Dr. Mills explained that this disease is very episodic. "You may have an infarct [a death of tissue] that is relatively minor, perhaps causing a peripheral nerve to go out, leading to a foot drop or wrist drop," he said. "Over time, the condition may partially heal, and you're okay for months, even years. Then suddenly another episode. . . ."

The MGH specialist, who is also Associate Professor of Medicine at Harvard Medical School, recalled a man who suffered a heart attack and made a full recovery. Several years afterward while attending a baseball game, he stood up to cheer and fell back into his seat with chest pains. He died a short time later at a hospital. An autopsy showed that periarteritis nodosa was the cause of both heart attacks.

Nodosa refers to tiny aneurysms or outpouchings along the wall of the weakened artery. In a vessel traveling just under the skin, the nodules can feel like a string of beads. The disease usually is treated with drugs that suppress the body's natural immune responses.

Hypersensitivity angiitis, a form of arteritis which affects small blood vessels

Arteritis is believed generally to be an autoimmune disease; that is, substances (antibodies) are produced within the body which act against components of its own tissue.

Dr. Mills said that the evidence for this is circumstantial. He stated that both periarteritis nodosa and an arteritis affecting small vessels — hypersensitivity angiitis — have been encountered in people during acute immune responses brought on by hepatitis-B viral infections. "That's about the closest we've come," he said, "to identifying the cause of arteritis in some patients."

A disease similar to periarteritis nodosa characteristically strikes people who have asthma coupled with a high level of certain white cells (eosinophils) in the blood. The disease is known as allergic granulomatosis or Churg-Strauss arteritis.

In a 1951 paper on this type of illness, Drs. Jacob Churg and Lotte Strauss of Mount Sinai Hospital in New York credited two MGH physicians, Drs. Francis M. Rackemann and Jeremiah E. Greene, both now deceased, as having previously described the syndrome in some detail.

Churg-Strauss disease responds to prednisone. In follow-up checks on such a patient, a physician simply takes an eosinophil count to make sure it is within a normal range.

A class of arteritis which Dr. Mills terms a particularly destructive form of inflammation involves primarily the sinuses and respiratory tract.

"Wegener's granulomatosis may come on very slowly as a severe sinusitis, then erode into an eye, affecting vision, or into the auditory apparatus, causing deafness," he said. "As the illness drags on, the patient may begin to develop coughs and chest pains."

Most of these patients fare quite well when treated with immunosuppressive drugs.

Just as giant cell arteritis chiefly afflicts people in older age groups, usually in the 60s and 70s, another type hits young children.

Kawasaki's disease, most of whose victims are under 5, starts with a fever that may reach 105°F and an accelerated heartbeat usually proportionate to the level of fever. Pain develops in joints. The mouth becomes inflamed, and a rash breaks out on the palms of the hands and soles of the feet, progressing to a massive shedding of skin.

Nearly a quarter of the young patients develop aneurysms on their weakened blood vessel walls. Any blood clots forming in these sacs could trigger a heart attack, or the aneurysms could burst.

In recent years, health officials have reported a rise in the incidence of Kawasaki's disease, and one specialist was quoted as saying, "For every case identified, I estimate another 10 go unreported."

Dr. Mills said the illness, which in Japan has become a major cause of heart defects in children, probably is caused by an infectious agent, but as yet nobody has been able to isolate it. ■

Special X-ray (angiographic) view of a kidney affected by periarteritis nodosa. Numerous white spots indicate aneurysms, or dilatations, on blood vessels.

A Doctor's Practice Means Commitment To Unending Study

Drs. Guillermo Brena (left) and Wallace Buttrick, who drive to the MGH from New Hampshire each Thursday to attend lectures on medical developments

Every Thursday morning Dr. Guillermo Brena of Manchester, N.H., gets up at five o'clock and a little later drives southward to rendezvous with a colleague, Dr. Wallace Buttrick, in Nashua, N.H.

The two primary care physicians then motor 39 miles to Boston to attend a series of lectures which begin at 8 a.m. at the MGH.

First, at a meeting organized by the Infectious Disease Unit, they learn about new developments in that field. If the session happens to be canceled, the two doctors drop in on another medical meeting – Neurosurgical Rounds. Neurological Rounds follow.

After an hour-long break, the visitors take in a medical study program known as a CPC (Clinical Pathological Conference). Each weekly program features a discussion of an unusual medical problem for which a diagnosis was established in the MGH's Pathology Department.

A few minutes to stretch their legs and the two Granite Staters are ready for still another meeting – Medical Grand Rounds. The subjects can cover any material, from the medical and surgical management of some affliction to the progress of research on a new drug or procedure.

Heading back to New Hampshire shortly after 1 p.m., Dr. Buttrick reaches his office by 2, and Dr. Brena is seeing patients again by 3.

The weekly excursion to Boston started in 1959 for Dr. Buttrick. He teamed up with Dr. Brena several years later. "I spotted his car with New Hampshire plates parked at the MGH and made a point of tracking him down," Dr. Buttrick explained. "We find the lectures so stimulating that we rarely miss the Thursday sessions."

The trip offers other advantages. The one-hour break during the morning permits the visitors to consult with MGH specialists about patients. "I remember I once put a lot of questions to Dr. Kubik [the late Dr. Charles S. Kubik, a leading MGH neuropathologist], and then I apologized," Dr. Buttrick recalled. "Dr. Kubik simply smiled and reminded me, 'This is a teaching hospital. We expect questions.'"

Attendance at the lectures also builds credit time toward meeting continuing medical education (C.M.E.) requirements of various medical societies and licensing boards. The general requirement is 150 hours during 3 years. It usually takes Drs. Buttrick and Brena less than one year to comply.

"In general, I think physicians have found that the accreditation requirements immersed them in a process which they turned out to like," said Dr. Stephen E. Goldfinger, MGH Physician and Associate Dean for Continuing Education at Harvard Medical School, "so they continue to come whether they need the credits or not.

"They recognize how much is happening in medicine, how learning new things can help their practices, and what a great sense of confidence continuing education can give them in their careers."

Harvard first offered continuing medical education more than a century ago when a handful of medical school graduates returned to seek further instruction. The trickle of interest, however, failed to build. Even in the early 1900s when the school established a separate faculty for C.M.E., the programs continued at a low level.

Subsequently, two spurts developed, the first shortly after World War II, the next about 10 or 12 years ago.

When the war ended in 1945, many physicians returned from military service feeling a need for refresher courses in civilian medicine.

Countless doctors also considered mid-career switches, taking advantage of opportunities to specialize. Unlike today when specialization entails years of formal, intensive training, a practitioner in the 40s could with proper motivation pursue advanced courses in a field and become at least sufficiently skilled to call himself a specialist. The body of knowledge existing then pales, of course, by comparison with today's.

The second C.M.E. spurt occurred when the American Medical Association introduced a Physicians Recognition Award, honoring doctors who had enrolled in continuing education programs and had accumulated a specified number of credits. At about this time, an increasingly enlightened public was beginning to ask:

"With all that is happening in medicine, how do we know that once certified a doctor will remain competent over his lifetime?"

To avoid the hassle of examination and recertification in the midst of one's career, the profession decided to go full steam ahead on the continuing education concept and established C.M.E. criteria for maintaining one's license to practice as well as membership in a medical society.

Dr. Goldfinger said there are several ways in which to accumulate required credit hours. Only 60 hours per three-year period have to be in so-called category-one programs sponsored or approved by an Accreditation Council for Continuing Medical Education. This is a consortium of seven organizations: the American Medical Association, American Hospital Association, American Board of Medical Specialties, Association of Hospital Medical Education, Association of American Medical Colleges, Council of Medical Specialty Societies, and Federation of State Medical Boards.

In addition to category-one programs, which may be lectures, courses, workshops, etc., the physician may earn credits

by reading, teaching, presenting an exhibit at a scientific conference, or attending noncategory-one lectures.

Harvard Medical School's Department of Continuing Education oversees 150 accredited programs. Of these, some 30 percent originate at the MGH. "We'll have 18,000 registrants this year from throughout the United States and about 30 foreign countries," said Dr. Goldfinger, who is also Associate Professor of Medicine at Harvard.

Unlike hour-long hospital rounds which earn category-one credit and are tuition-free, some accredited programs continue for days with participants paying a fee.

Typical of these is a four-day MGH conference conducted almost annually for doctors interested in interventional radiology. This is a rapidly evolving field that offers nonsurgical ways of dealing with many problems customarily addressed in the past by surgeons. With one of the new techniques, a specialist can unclog a narrowed artery by simply threading a balloon through the vessel to the site of the blockage and then inflating the balloon to spread apart the artery's walls.

Directed by Drs. Christos A. Athanasoulis, MGH Chief of Vascular Radiology, and Arthur C. Waltman, the conference usually attracts some 200 physicians, most of them radiologists, from throughout the United States and Canada. The roster of guests has also included enrollees from as far as Australia and Saudi Arabia.

After two days of formal lectures, the agenda is given over to small workshops, each repeated until all of the conference participants have rotated through the five or six different sessions.

"At the end of the course," said Dr. Athanasoulis, "we ask each registrant to fill out a form seeking comments on the conference and suggestions for improving it. We get a lot of helpful feedback."

On occasion, the MGH staff lends a further helping hand. Dr. Athanasoulis told of a doctor in Arkansas who after attending the Boston conference tried to use interventional radiology to help a patient with a blocked pelvic artery. Both a clot and a narrowing in the patient's iliac artery prevented blood from flowing to his threatened right leg.

"The physician telephoned to say that for a half hour he had fed streptokinase through a catheter [tube] to dissolve the clot but had only partially succeeded," said Dr. Athanasoulis. "He wanted advice on how to proceed.

"We advised him to continue the infusion for another hour to dispose of the clot and then use a balloon to open the stenosis [the narrowed area]. The doctor later called back, said he had followed the suggestions, and the patient was doing well."

In addition to developing a greater awareness of new technologies and treatments, the C.M.E. participant, perhaps more importantly, gains what Dr. Goldfinger describes as a new "sense of validation for what he does."

"The physician who comes from a place where he may feel isolated in his specialty can see how the experts at Harvard handle patients," said Dr. Goldfinger. "The visitor often returns home later reassured that he is not doing anything differently. In effect, he can say to himself, 'I'm practicing pretty good medicine.'" ■

As part of their continuing education, members of the MGH Psychiatry Service and other departments gathered to hear a talk on child abuse.

Technician Deborah Rempis (standing) and Staff Nurse Betty Angel discuss capabilities of X-ray equipment recently installed at the Logan medical unit.

Airport Station Strives For Safety on the Job

(Continued from Page 1)

Boston Department of Health and Hospitals speeds to the scene.

"Depending on traffic and where they are when alerted, the paramedics may need 20 minutes to reach us," said Dr. O'Malley, "but they do a superb job. After preliminary care, they take the patient to the MGH Emergency Ward, which is closer to the airport than Boston's City Hospital."

The doctor estimated that since the airport emergency procedure began about a year ago, 80 to 90 percent of the patients who suffered a cardiac arrest have reached the MGH with their heartbeat reestablished.

Emergency medical equipment soon will be made available on request to qualified physicians visiting the airport at the time of a distress call. Also, four people from the MGH medical station and three from the Logan fire department will be trained as instructors in CPR (cardiopulmonary resuscitation). They in turn will train as many employees at the airport as they can.

The medical station is engrossed in efforts to assure worker safety in jobs which by their very nature pose hazards. Baggage handlers, for example, risk back injuries through repeated heavy lifting, body twisting, and crawling into aircraft

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Planning a trip abroad, a woman undergoes skin tests at the Logan medical station to make sure she is not allergic to yellow fever vaccine.

Logan Unit Offers Airport Hearing Tests

(Concluded from Page 5)

storage areas.

Dr. Elisha Atkins, an internist who also holds a master's degree in occupational medicine from the Harvard School of Public Health, outlined some of the MGH efforts:

"In addition to being represented on labor–management health and safety committees at the airport, we observe people at work sites and give advice to them and their supervisors on how to prevent injuries.

"In situations where a person has suffered a back injury, physical therapy together with special back braces and proper training in how to do lifting can minimize the chance of being hurt again. Companies at the airport have been very cooperative about finding modified duty for injured employees during recovery periods."

Dr. Atkins said that noise exposure is a major problem at Logan. "Many workers have suffered noise-induced hearing damage," he said, "partly because not as much was known in past years about protecting hearing, partly because some workers did not understand the need for safeguards, and partly because there were no good laws covering hearing protection."

Today, airport noise comes under federal standards and control, and the medical station assists Logan firms in complying. Dr. Atkins said the effort includes training workers on how to protect themselves and also involves yearly audiograms.

"These tests are given by a certified technician at the medical station," he said. "They can pick up hearing problems even before the worker realizes that something is wrong. An increasing number of airlines are sending employees to us."

On occasion, the medical station treats people for the toxic effects of a chemical spill. The staff later tries to assess the possibility of a repeat accident. Perhaps a company's policy regarding use or storage of the chemical, such as a floor cleaner or solvent, needs revision.

The ever increasing growth and needs of Boston's airport create new responsibilities for the MGH's Logan medical station.

Other new programs conducted by the MGH–Logan unit include a package of health care services for the 6,000 women who work at the airport. Coordinated by Jean Delaney, RN, Clinical Nurse Leader at the station, the project makes available to women the primary health care services of physicians and nurse practitioners on issues of health maintenance, birth control, and cancer screening, plus the counseling of a nutritionist.

The Women's Health Care Program was introduced in January with an offer of free Pap smear tests as part of a continuing nationwide drive to reduce the number of deaths from cancer of the cervix. This month a free breast examination program is being offered.

Several years ago, plants in Chelsea, Everett, and East Boston invited a team headed by Dr. O'Malley to screen employees for hypertension and to offer treatment where necessary (*MGH News*, January–February 1978 and November 1980). Since becoming director of the Logan medical station two years ago, Dr. O'Malley has extended this program to airport workers.

"We have screened about 1,000 individuals at Logan, including employees of TWA and American, Eastern, and Delta Airlines," he said. "We helped arrange care for those people who had high blood pressure and were not under treatment at the time."

For air travelers whose destination raises a possible need for special health precautions, the Infectious Disease Unit at the MGH has joined with the medical station to expand its long-standing Travelers' Advisory Service.

Dr. Stephen B. Calderwood of the Infectious Disease Unit described the new operation:

"Beginning July 1, Infectious Disease Associates will join the Logan Airport Medical Station in a combined effort to administer immunizations and prophylaxis [protective treatment] to prospective travelers and to treat patients who have acquired infections abroad.

"A computerized listing of travel requirements and recommendations has been developed and will be constantly updated at both locations. Prospective travelers should be seen at least 6–8 weeks prior to departure to allow completion of any required vaccinations."

Still another change for the medical station has been a restructuring of the Logan Airport's disaster response plan. Until a year and a half ago, the principal role of Boston's Emergency Medical Services System under the plan was as ambulance provider.

"The city's emergency medical units now occupy very essential roles," said Dr. O'Malley. "They will do field rescue work, assist in triage [determining priority of treatment for the injured], and be in charge of coordinating transportation."

In any disaster, the MGH–Logan Medical Station will continue to provide the physician to oversee the entire emergency operation, making sure that resources are adequate and that personnel go to where they are needed. In the event a disaster occurs when the station is closed, the East Boston Neighborhood Health Center will furnish the supervising medical officer. ■

Sunbathing
Tonic or Toxic?

With summer only weeks away, millions of American sun worshippers will soon renew their annual pilgrimage to the nation's beaches.

To avoid severe burns from overexposure to the sun's powerful ultraviolet rays, many people will daub their bodies with liberal amounts of a sunscreening lotion or cream.

For the vast majority, this important precaution will prove highly effective. For another few, however, the action that was designed to protect will instead harm.

Just as reaction to the sun's rays can differ widely from person to person, so can sensitivity to sunscreens vary. Some people are so sensitive to ingredients in sunscreens that their use may lead to widespread irritability of the skin, allergic rashes, and other complications.

Dr. Thomas B. Fitzpatrick, MGH Chief of Dermatology, told of a woman in Florida who suffered from high blood pressure and, as part of her treatment, regularly took a diuretic (a drug to increase the secretion of sodium). While preparing to sunbathe, she applied a sunscreen which provoked a rash and itching. The woman went to a local pharmacy and bought a skin balm which she rubbed on her body, hoping to counteract what had happened.

Her condition only worsened. In desperation she flew to Boston and entered the MGH for several days of treatment.

Studies revealed that the patient had suffered a triple reaction to PABA (para-aminobenzoic acid), by far the most common ingredient in sunscreen preparations sold in the United States.

"Reactions were produced by the diuretic because it is a cousin of PABA, by the sunscreen due to its PABA content, and by the skin soother since it also contained a PABA-related substance," Dr. Fitzpatrick explained.

Although the Florida woman rebounded from her skin eruption, the sensitivity stimulated by her exposure to PABA will bar her from virtually all diuretics now on the market since they have a link with the PABA molecule.

Dr. Fitzpatrick did find a substitute diuretic, however, a potent drug called ethacrynic acid, which bears no relation to PABA. His patient has switched to the other drug.

The doctor emphasized that the number of people sensitive to PABA is extremely small – perhaps as few as 1 in 100,000 – and use of a diuretic does not automatically rule out sunscreens containing PABA.

"Personally, however, I do tend to recommend that people on diuretics use a non-PABA sunscreen," he said. "I would hate to prescribe PABA only to learn later that the individual was sensitive and would not be able to take most diuretics again."

He suggested two non-PABA preparations which contain cinnamates and benzophenones, PizBuin, developed in Europe, and TiScreen, as good substitute sunscreens.

Each June, Dr. Fitzpatrick and colleagues in the Dermatology Department fly to San Antonio to conduct sunscreen tests under a variety of hot weather conditions. "Some non-PABA agents have proved to be just as effective as the PABA ones," Dr. Fitzpatrick said.

Skin distress arising from the use of sun-shielding agents is not confined to PABA. Cinnamates can also cause dermatologic problems. So can certain preservatives. Usually sunscreen intolerance is not identified until a reaction occurs.

"If a rash, itching, or any other unusual sunburn reaction develops, consult a dermatologist," advised Dr. Fitzpatrick, who is also Wigglesworth Professor and Chairman, Department of Dermatology, at Harvard Medical School. "If professional help is not at hand, application of one of the hydrocortisone creams available over the counter can be beneficial."

He added that water or milk dressings, or so-called oatmeal dressings available in stores, can soothe the affected skin.

Sunscreens have undergone rapid improvements since 1969 when, in a *New England Journal of Medicine* article, Drs.

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Various sunscreens applied to the backs of these sunbathers were closely monitored by MGH researchers to determine how well the products remained effective despite sweat.

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MGH Studies Aided Sunscreen Growth

(Concluded from Page 7)

Madhu A. Pathak, Thomas Fitzpatrick, and Edgar Frenk, all of the MGH, reported discovery of a formula by which PABA, known since 1922, could provide highly effective protection of the skin against solar rays.

Before the MGH team began its research in 1965, PABA was a known absorber of ultraviolet radiation, but the substance did not remain on the skin very long.

The MGH initiated its work at the request of the United States Army which was concerned about its troops in tropical areas. Often assigned to outdoor work, the troops risked crippling sunburn. The Army sought a sunscreen that would last and resist sun and sweat.

Since skin is a layer of protein, the researchers sought a way to anchor a sunscreen to the chief component of protein, amino acids. After much experimentation, the team found that 5 percent PABA in 55–70 percent ethyl alcohol would do the trick.

Volunteer bathers test the resistance to water of sunscreens on their bodies.

Further, when using PABA esters, derivatives of the chemical, only 2.5 percent had to be combined with the alcohol base.

PABA would not wash off during an entire day of sweating, but anyone who swam for more than 20 minutes would lose 75 to 80 percent of the sunscreen and would have to reapply it.

"Today preparations are available which will resist the washing-away effect even if someone swims continuously for 45 minutes or an hour," said Dr. Pathak. "Industry now uses a water-resistant acrylate polymer base in combination with a PABA ester. Unlike alcohol, the acrylate polymer provides good body, like a salve, for better application. The new base also contains softening or lubricating agents that help the skin during sun exposure. Many people do not like the alcohol base, feeling that it dries their skin."

Dr. Fitzpatrick stressed that anyone shopping for a sunscreen product should not feel assured of something worthwhile just because the word PABA is on the label.

"There are two ingredients to a sunscreen, the filter and the base it's in," he said. "There is a definite art to making the proper base and putting the ingredients together to make the product effective."

How can one know what to buy?

"You have to trust the reputation of the company," the doctor answered. "Those that provide quality control know they have to be very careful in what they put out." ■

Shedding Light on Some Myths

Many misconceptions exist about the sun's effects on human skin and how to protect the skin.

Dr. Madhu A. Pathak, a senior dermatologic researcher at the MGH, outlined some of the myths:

At the beach on a bright, clear day, one can avoid sunburn simply by staying in shade, such as under a beach umbrella.

Fact: Although shade may reduce direct exposure of the skin to solar rays, light reflected from sand and other surfaces can inflict a burn.

* * *

A sunburn is unlikely on a cloudy or hazy day.

Fact: One can still receive 70 to 80 percent of the ultraviolet (UV) radiation that would be present on a bright day. And since people tend to expose their bodies longer when clouds filter out the sun's heat, the risk of a burn increases.

* * *

Sunscreen lotions or creams will promote or accelerate a tanning response.

Fact: Tanning is not induced or augmented by sunscreens.

* * *

Products that promise quick tans also protect the skin against the harmful effects of UV radiation.

Fact: Quick-tanning formulations act as dyes coloring the skin. The color possesses no light-protective qualities.

* * *

Blacks, Orientals, and Asiatics do not sunburn; therefore, they do not need sunscreens.

Fact: All races can sunburn, although some may require larger doses of UV radiation to exhibit the sunburn reaction.

* * *

Fair-skinned individuals who burn easily can acquire a tan by repeated exposure to the sun.

Fact: The ability to produce a tan is genetically predetermined by the functional capacity of a person's pigment-producing skin cells. Repeated sun exposure by fair-skinned people may not produce a tan but only lead to irreversible skin damage, e.g., wrinkling, aging, drying, and even skin cancer.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 43 No. 5 June–August, 1984

Repairing Facial Nerve Defects With Microsurgery

A physical disorder which can indefinitely affect sensation and the ability to eat normally is finally yielding to new surgical techniques.

For the past four years, MGH researchers have sought ways to overcome sensory nerve disturbances in the face that sometimes occur unavoidably during certain oral surgical procedures or when facial bones are fractured.

"Through new methods of employing microsurgery, we appear to have found the solution for many patients," said Dr. R. Bruce Donoff, Chief of Oral and Maxillofacial Surgery at the MGH.

A technology which has developed continually since the early 1970s, microsurgery permits repairs of the most minute veins, arteries, nerves, and tendons with the aid of operating microscopes and specially designed instruments (*MGH News*, May 1976, September 1981, and January–February 1984).

The facial disturbances involve components of the trigeminal nerve system which transmits sensation from both sides of the face to the brain. The nerves most affected are the mandibular (or inferior alveolar) nerve which courses through the lower jaw and the lingual nerve which serves the tongue.

Extraction of a tooth occasionally brings pressure upon one of the nerves. Relief usually comes with the passage of time, but sometimes the disturbance persists due to scar formation around the nerve.

More often than not the problem centers on a wisdom tooth at the rear of the mouth. In the evolution of man, the need for this molar diminished as his lower jaw became smaller. Today the tooth is no longer vital for a proper bite. The molar may grow incorrectly, becom-

(Continued on Page 2)

Revere Health Unit Opens New Quarters

(Third article on ambulatory care)

More and more people in Revere, Mass., are saying these days that "you don't have to go to Boston to go to the Mass. General."

From its original location in half of a small, two-story duplex, the MGH–Revere Health Associates, acquired by the hospital in 1981, moved in May to quarters that are more modern, more accessible, and nearly three times larger.

The center's new home, a 4,200 square foot area of the centrally situated Revere Post Office, will permit expansion of health care in the Boston suburb of 43,000 which the federal government classifies as a medically underserved community.

Specialists in internal medicine, pediatrics, obstetrics and gynecology, podiatry, nutrition, and social service staff the MGH unit, that is open Monday through Friday from 8:30 a.m. to 5 p.m.

A nurse practitioner works full time in the center. A second nurse practitioner, who specializes in pediatrics, divides her time between the unit and visits to community day care centers and schools where she serves as a consultant.

"The Revere unit represents more than

(Continued on Page 5)

After 66 years of training practical nurses such as Anne Dooley, LPN, shown below, the MGH's Shepard-Gill School is closing. (story on page 7)

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EDITORIALS:

Helping Children Overcome Disabilities

Not too long ago problems of early childhood took a dreadful toll. In fact they had a sobering influence on the country's longevity statistics. As a page 4 story in this issue points out, however, the situation is changing. With children surviving these once fatal injuries or diseases, the emerging problem is to treat the handicaps that sometimes accompany survival. One answer comes in the form of the MGH's new Edwin Phillips Trust Rehabilitation Unit. Working to help children overcome their physical problems, the unit will be able to affect lives in a most beneficial way.

Opening a New Home

The MGH–Revere Health Associates has just opened a new home. The large space in the Revere Post Office symbolizes the success of the latest MGH neighborhood health center. As with the MGH–Chelsea Health Center, Revere moved after the growing number of patients could no longer be served in the original quarter. The new home assures the people of Revere that for many years they will have a conveniently situated, adequately sized place to obtain health care.

A Tradition is Ending

For 66 years the Shepard–Gill School of the MGH has produced dedicated licensed practical nurses well-trained to perform their duties. Graduates have gone to hospitals over a wide geographic area. Now that tradition is ending. The Shepard–Gill School is closing, a victim of the times. The nation's nursing leadership has decreed that nurses with college degrees are the beacons of the high technology future. And so, many licensed schools of practical nursing and RN diploma schools are closing. In place of the LPNs are superbly trained nurses capable of working with the most difficult technologies in treating people to help conquer their illnesses. Still one will miss the new classes of LPNs who have graced so many hospitals for so many years.

Pain Spurred Hunt For Way to Mend Disrupted Nerves

(Continued from Page 1)

ing impacted and requiring extraction. Pressure upon the nerve during removal of the tooth may be unavoidable due to their proximity.

When a fractured jaw occurs, the break frequently runs through the same area as the mandibular nerve, raising the threat of a bony compression upon it.

And sometimes damage to a nerve may be a tear which could result in scarring within the nerve, creating a so-called neuroma.

Depending upon the nature of the complication, the consequences could be a numbness in a portion of the mouth or jaw or a problem eating because of what Dr. Donoff termed "shooting sensations" into the tongue or lips.

"This discomfort may be pain," he said, "but more often it is just a terribly abnormal feeling."

Dr. Donoff estimated that in the past perhaps 1 to 3 percent of patients who had impacted wisdom teeth removed suffered impaired sensation. Most of these patients regained normal sensation with time.

"Most who do not regain normal sensation learn to live with their numbness," he said, "but since the condition of some patients includes a pain component, we decided to see whether microsurgery offered a solution."

As the doctor and his team developed microsurgical techniques that showed laboratory promise of helping combat the facial nerve disruptions, they began to apply the procedures in a selected group of patients.

"We used very strict criteria in our selection," emphasized Dr. Donoff, who is also Professor and Chairman of the Department of Oral and Maxillofacial Surgery at the Harvard School of Dental Medicine. "We refused to consider any patients for microsurgical intervention unless their problem had persisted for at least six months. The reason is that so many of these injuries repair themselves within six months. Secondly, pain had to

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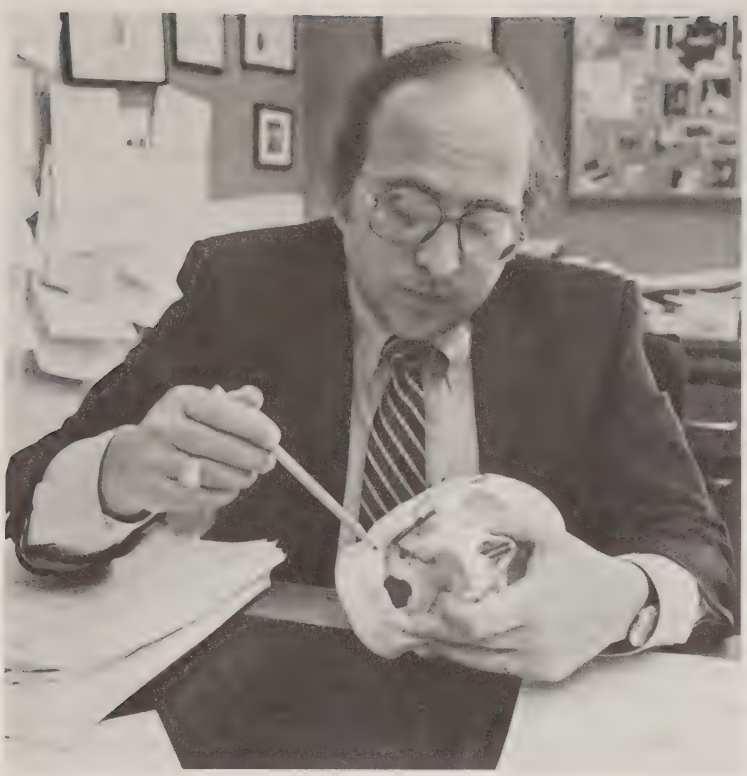
Photographs: Pages 1, 3 (upper), 4, 5 (upper), 7, 8, Myron Daniels; p. 3 (lower), courtesy of Dr. R. Bruce Donoff; pp. 5 (lower), 6, courtesy of Robert Tonner



Dr. R. Bruce Donoff points to one of the most common areas of pressure upon a facial nerve.

be a part of the problem."

During the past four years, the team applied the new techniques to 46 patients. In March, speaking before the International Association for Dental Research in Dallas, Dr. Donoff reported on 30 of the patients whom he had followed for more than a year. Their median age was about 33.

"We noted 70 percent improvement among 10 patients whose mandibular, or lower jaw, nerve had been disturbed and 80 percent improvement among 20 patients with lingual nerve, or tongue, involvement," the doctor said.

Scar or bone compression accounted for the vast majority of difficulties. The surgeons did encounter what proved to be torn nerves, however, and these repairs required a graft.

"We obtained a segment of sensory nerve two to three centimeters long [each centimeter being about the width of a paper clip] from the back of the patient's heel," Dr. Donoff stated. "We rarely needed more than that.

"Removal of the nerve produces a numbed area the size of a half dollar on top of the foot where the patient typically doesn't notice the change."

All of the nerve procedures call for a general anesthetic, and most patients remain in the hospital for one or two nights. After about a week's convalescence at home, they can return to normal activities.

The doctors schedule checkups after one week, three months, six months, and one year. By six months, the outcome of the treatment can be fully assessed.

Since reporting on his work to colleagues in Dallas, Dr. Donoff said he receives calls almost daily from various parts of the country regarding patients with facial nerve difficulties. His department has also initiated an educational program for specialists. The doctor said the course has attracted considerable interest from colleagues.

Suturing two nerve segments with the aid of a microscope

At the same time, the team is fine-tuning other treatments that have been devised. The most common treatment has been a procedure called a neurolysis whereby the surgeon uses a microscope to carefully remove scar tissue compressing upon a nerve.

"Recently we have been doing not only an external neurolysis but also an internal one, opening up the sheath of the nerve and freeing the nerve itself of scarring," Dr. Donoff said. "That would be impossible with just the naked eye."

In the laboratory, one of Dr. Donoff's students at the Harvard School of Dental Medicine, Wayne Colin, is conducting animal research on a possible synthetic substitute for nerve grafts.

Disruption of a facial nerve often can be attributed to the extraction of a wisdom tooth at the rear of the mouth.

"The work to date suggests that tubes made of collagen [the structural material that holds tissue together] can bridge a nerve gap and eliminate the need to take a nerve from elsewhere in the body," Dr. Donoff said.

On the basis of his efforts in microsurgery, Mr. Colin earned top student honors for research in a recently held nationwide competition. The National Institutes of Health has also awarded him a two-year grant to continue his laboratory studies at the MGH.

Dr. Donoff said that "although we may remove scar tissue from a nerve, we don't have any mechanism to prevent the reformation of the scarring. In addition to serving as nerve grafts, these collagen tubes might act as sleeves around a nerve to prevent the recurrence of scars."

Dr. Donoff reiterated that when sensory nerve deficits occur in the lower part of the face they usually are observed following removal of one or more wisdom teeth.

"Where the lingual nerve, or mouth involvement, is concerned, there is no way to measure the degree of risk," he said. "But with regard to the mandibular, or lower jaw, nerve, the relationship of the wisdom tooth to the mandibular canal through which the nerve runs can often indicate the potential problem." ■

Helping Disabled Children Get Well Faster

The emphasis in pediatric practice is shifting.

"Advances in medicine have dramatically increased the chances of children to survive disease or injury," said Dr. Donald N. Medearis, Jr., Chief of the MGH Children's Service. "But often disabilities of one kind or another accompany that survival.

"Thus, although we gain in our efforts to save lives, we are facing a new challenge: how to care for a growing population of children with handicaps."

To tackle the problem, Dr. Medearis has announced establishment of the Edwin Phillips Trust Rehabilitation Unit on Burnham-4, one of the hospital's principal pediatric floors. The Phillips Trust is dedicated to helping children who are disabled.

"What we have done is designated and equipped a place where specialists in many areas of medicine can meet and interact for the benefit of the handicapped or multiple-injury child," said Dr. Michael

At MGH's Spaulding Rehabilitation Hospital, cerebral palsy patient Eddie Grant, 7, shows Physical Therapist Rebecca Barrett how well he uses a walker. Eddie first walked in the MGH Pediatric Rehabilitation Unit.

G. Ehrlich, Chief of Pediatric Orthopaedics and one of the founders of the new unit.

"As a young patient undergoes acute care for a disabling illness, congenital disorders, or injuries resulting from a traffic accident, our team can at the same time begin rehabilitative efforts to help produce a quicker and more meaningful recovery."

Dr. Elizabeth C. Dooling, a pediatric neurologist who directs the unit, told of a 15-year-old high school boy who was brought to the MGH in desperate condition after an auto in which he was a passenger smashed into a post.

"The impact catapulted the boy from the vehicle," she said. "He suffered multiple injuries, including a skull fracture, and was in a coma for 3½ weeks in our intensive care unit [I.C.U.].

"By the time he left the I.C.U., he had emerged from the coma but was aggressive, disoriented, and had memory problems. He could not talk or care for himself in any way.

"Gradually, during 4 or 5 weeks in the rehabilitation unit, with the intervention of people from neurology, neurosurgery, orthopedics, speech pathology, physical and occupational therapy, and, of course, around-the-clock nursing, the patient improved.

"He later was transferred to another facility but continued to make such rapid improvement there that he was sent home within a week or 10 days. He soon returned to school in good health with all cognitive functions back."

Another patient, a twin, at birth had suffered an injury which resulted in cerebral palsy (C.P.). Now 8 years old, he came to the MGH for some corrective surgery and then was transferred to the rehabilitation unit.

Stricken with one of the more severe forms of C.P., the youngster was confined to a wheelchair and displayed few communicative skills. He spoke only to his mother.

Through the consistent efforts of his nurses as well as physical, occupational, and speech therapists, the boy in time learned to stand and take steps with a walker. He also learned to feed himself and, as for communicating, while awaiting a visit by his parents he would sit near the nurses' station and chat with people as they passed.

Very often a child who has undergone orthopedic surgery must initially wear a plaster cast that covers much of the lower part of the body. Another child might have a genitourinary surgical procedure and require extended bed rest.

"In either case, if the patient is someone with a congenital musculoskeletal problem, you are dealing with an individual whose weakened condition is a long-standing one," said Julie Charbonneau, RN, B.S.N., head nurse on Burnham-4. "Rehabilitative therapy becomes very important because the nonuse of muscles can lead to contractures.

"As soon as possible, such patients are guided through appropriate range-of-motion exercises and then more active exercises, including ambulation. Sometimes they need the assistance of braces or walkers.

"As a result of our program, we've seen

Rehabilitation Unit Staff Nurse Ellen McCarthy exercises the arm muscles of Jay Talbot, 18, also stricken with cerebral palsy.

some children leave with even better function rather than with any loss in their range of movement."

Because rehabilitation patients require expert, specialized nursing care, Jennie McKinney, RN, B.S.N., and Ellen McCarthy, RN, B.S.N., both of Burnham-4, have received additional training in this area. Together they serve as on-site, daily coordinators of the children's care. They have developed informational literature for the families, nursing standards of pediatric rehabilitation practice, and formal educational programs for pediatric nurses and others.

The success of every rehabilitation unit depends on team discussions and assessments of the appropriate goals for a given patient as well as inclusion of the patient and family in the planning.

The team meets on Monday mornings, bringing together Dr. Dooling of Pediatric Neurology; Drs. Ehrlich and David Zaleske of Pediatric Orthopaedics; Nurses McKinney and McCarthy; Jane Merrill, a pediatric physical therapist; Dr. Joseph Hallett, an MGH pediatrician who also heads the Child and Adolescent Unit at the MGH's Spaulding Rehabilitation Hospital, and, when appropriate, representatives of the Social Service and Dietary Departments.

"During Monday's rounds, specific adjustments and therapeutic regimens might be prescribed for patients in the rehabilitation unit," said Dr. Zaleske. "The rounds are also devoted to going through the

Children's Service and seeing whether any other patients undergoing acute care might benefit from the rehabilitative services."

On Thursdays, rounds are held again. This time, the team members study the charts of each patient in the rehabilitation unit to assess the progress the patient has made and to plan the treatment for the following week.

The presence of Dr. Hallett at the team rounds underscores an important aspect of the concept which led to creation of the unit. Very often a child recovers sufficiently to go directly home upon discharge from the rehabilitation section. For others, however, further treatment is called for.

Dr. Hallett's presence facilitates the transition to Spaulding of those patients who need extended care.

"When one is familiar with the child and his problems from the beginning, time is not lost in getting to know the patient, in understanding the complexities of the situation, and in carrying forward the most appropriate treatment plan," Dr. Hallett said.

Drs. Dooling and Zaleske see patients in consultation at Spaulding, thus assuring a continuity of care by the same professionals. The physical therapists at Spaulding may visit the MGH rehabilitation unit during the closing days of an admission there to meet with their future patient and consult with the therapist who had been caring for that individual.

Dr. Joseph Hallett (left), Dr. David Zaleske, and Physical Therapist Jane Merrill form part of the team helping auto accident victim James Perry, 17.

Many of the children who are able to go home directly from the MGH are seen later in follow-ups by their doctors during periodic office visits in the hospital's Ambulatory Care Center.

Opened last July, the rehabilitation unit operates in modest fashion with three beds. Although the age of patients on the fourth floor of the Burnham Building ranges from 8 to 18, the rehabilitation area will accommodate children as young as 5.

"We lowered the age there because many children with congenital difficulties, such as cerebral palsy or myelodysplasia [spinal defects] have a predominance of surgical needs at an early age," said Dr. Medearis, the Children's Service Chief who is also Charles Wilder Professor of Pediatrics at Harvard Medical School.

"We do not plan to assign very young patients to the rehabilitation unit because for them the care tends to be better if it is age-directed. That is, infants belong on a floor with other infants."

Dr. Medearis emphasized that the MGH is not competing with chronic care institutions because they work with children who are stable and have no acute medical or surgical needs.

"We're simply getting the recovery effort started earlier," he said. "We think that that early push coupled with a highly coordinated type of treatment involving a number of specialties offers hope of ultimately shortening a patient's care while also brightening his chances for the future." ■

MGH Expands Care For Revere Citizens

(Continued from Page 1)

just a long-term commitment of medical care to the people of the Beach City," said Robert Tonner, Administrative Director of the MGH's Neighborhood Health Center Group. "The facility is an extension of the MGH itself.

"A physician at the Revere center can quickly arrange complex diagnostic tests at the hospital. And if the patient requires hospitalization for some surgical procedure or other treatment, his doctor at the center can arrange admission, follow the individual through the MGH stay, and then continue the personal attention after discharge."

The thorough and carefully coordinated care at all levels assures the patient of the speediest possible recovery and return to normal pursuits.

In addition to Revere, the Neighborhood Health Center Group embraces MGH medical stations in nearby Chelsea and Charlestown and at Boston's Logan International Airport.

Avoiding what would be a costly duplication of services, physicians at Revere work in close alliance with the larger, more comprehensive operation in Chelsea, only five minutes away by car.

Dr. Roger H. Sweet, Medical Director of the Health Center Group, said that Chelsea provides whatever routine X-ray or laboratory work may be necessary and also maintains an Emergency Room that is open around the clock.

(Concluded on Page 6)

Refugees from Southeast Asia who settled in Revere tend to have a number of health problems.

Revere Refugees Bring Special Needs

(Concluded from Page 5)

Demonstrating how Chelsea and the MGH figured prominently in the care of a Revere patient, Dr. Sweet told of a man in his mid 50s who appeared at the Revere health center one day complaining of what he thought was a severe cold.

Because the patient not only had a persistent cough but also had been spitting some blood, the doctor who saw him at the center ordered a series of tests.

At Chelsea, the patient had his chest X-rayed, and a technician there also did a sputum culture to check for the presence of any bacteria which could indicate an infection. At the MGH, the Cytology Laboratory examined a sputum sample under the microscope to determine whether any cells had undergone malignant changes.

"Both the X ray and the culture proved negative, but the cytology report came back positive for cancer of the lung," said Dr. Sweet, who in addition to being an MGH Physician is also Associate Professor of Medicine at Harvard Medical School.

"The patient was called back to the health center, and arrangements were made with the thoracic surgical unit at the MGH for his admission to the hospital.

"Following further tests, one of the senior thoracic surgeons operated and removed a very small carcinoma of the lung. That was a year and a half ago. We have followed the patient ever since, and he has been fine."

As a result of his experience, the man has brought his entire family into the MGH health care system in Revere.

Aside from this system, medical care within this city on the Massachusetts North Shore is furnished only by private doctors and at two small, commercially run clinics.

An influx into Revere of some 1,500 refugees from Southeast Asia during recent years underscored the need to expand the city's health care capabilities.

Dr. Sweet said the refugees – most from Cambodia but including some from Vietnam and Thailand – arrived with many health problems.

"These were people who had either lived in jungles to escape oppressive rule or had spent as long as two years in crowded refugee camps," the doctor said. "When Congress permitted their arrival here under terms of a resettlement act, some of the refugees were found to be suffering parasitic, tuberculous, nutritional, and other problems so common to poverty-stricken areas of Southeast Asia."

The Massachusetts Department of Public Health provided a grant for community outreach and the hiring of interpreters. The center is now one of the focal points for refugee health care in the Greater Boston area.

"Our patient volume increased to the point where the space previously occupied by the health center was no longer adequate to deliver patient care," said Mr. Tonner, the administrative director.

"By moving to the more spacious condominium office area in the post office, we were able to increase our examining rooms from five to nine, offer much larger waiting areas, and provide room for more efficient record-keeping."

Situated in the heart of Revere, the center is served by two bus lines. Public transportation to the previous quarters, about a mile from downtown, was much less convenient.

The Revere Health Associates first opened in 1976 as a freestanding entity governed by its own, locally based board of directors. In just a few years the board found itself confronted by seemingly insurmountable administrative and financial difficulties and requested MGH assistance under a management contract.

After a year of such aid, the hospital began negotiations for ownership. It purchased the premises and transferred all of the staff who wanted to stay to the MGH payroll. Patient visits averaged between 11,000 and 12,000 a year during the 1970s, fell to 3,600 before the MGH took over the center, and have since risen once again to about 12,000.

"The size of the staff is not that much different than when we took over the place," Mr. Tonner said. "Increased acceptance in the community accounts for the higher usage."

Starting this summer, the MGH's Pulmonary II Clinic, which treats patients suffering from tuberculosis, is branching out from the hospital's main Ambulatory Care Center to also provide on-site treatment in Chelsea.

"Pulmonary specialists will come from the MGH to attend to the needs of residents of both Chelsea and Revere who for one reason or another prefer not to travel to Boston," said Dr. Sweet.

Other new programs benefiting Revere are anticipated, but it will take a while before they come off the drawing boards.

"We're very interested in planning with the city to do off-site care for the elderly, both those who are shut-ins and others living in developments for the elderly," Dr. Sweet stated. "There would have to be special staffing for this, however."

Other potential long-term goals include establishment of a rehabilitation program for heart patients and a sports medicine clinic.

The health center already has a good prospect to help guide that sports medicine project. One of the center's internists, who also is board certified in pediatrics, is a former Olympic nordic skier. ■

The new home of the MGH–Revere Health Associates

Shepard-Gill School Records Its Final Class of Nurses

The Shepard-Gill School of the MGH will graduate 48 students August 23 in an atmosphere characterized more by sadness than joy.

For the new graduates of the second oldest school of practical nursing in the United States will also be the institution's last.

Closing its doors after 66 years of continuous operation, the school on fashionable Newbury Street in Boston's Back Bay has fallen victim to changing times. As medical care becomes increasingly sophisticated and complex, educational requirements imposed on the professional nurse grow more demanding.

Ronald S. Nichols, Director of Shepard-Gill since it became a part of the MGH in 1970, said the hospital feels that degree programs – either of two years' or four years' duration – offer better preparation for people entering the nursing field. The course of study at Shepard-Gill extends for 48 weeks.

"In addition, there is a problem of credentials," said Mr. Nichols. "A certificate program such as ours does not provide transferable academic credits. In order to have any kind of career mobility, certificate recipients might find they have to start over from scratch."

A registered nurse who earned a bachelor's and a master's degree from Boston College, Mr. Nichols said there are many visible signs that the future of practical nursing education in general is "a little bit shaky."

Rochelle Butler, LPN, obtains medication prescribed for a patient.

"Proposition 2½ closed several schools of practical nursing in Massachusetts a couple of years ago," he said. "Several others just don't know how long they will be able to keep going."

Well over 90 percent of practical nurses serve in hospitals or nursing homes. The rest fill scattered other needs: visiting nursing care, private duty nursing, or service in industry.

In terms of manual skills, Mr. Nichols sees little difference between the practical nurse and the registered nurse.

"The major difference," he said, "lies in areas of judgment and decision-making. The breadth of theory in nursing and science to which the RN candidate is exposed gives that person an ability to make assessments and plans that the licensed practical nurse just doesn't have."

RNs also become more easily attuned to the high technology procedures that are considered so indispensable in today's medical practice.

"Even in the psychosocial area – a very important part of nursing – the RNs are much better prepared," said the Shepard-Gill director.

"Our students might have something like 30 hours of combined classroom work in psychology and sociology. The RN probably will have had several courses in each of those subjects, plus perhaps anthropology.

"Such an education would be very helpful to a nurse in understanding a patient's responses to illness. At Shepard-Gill we just don't have the time to prepare students that way."

Practical nursing, however, has undergone tremendous advances since 1918 when the Shepard-Gill School opened. The name honors Miss Katherine Shepard, the school's first Director, and Miss Helen Gill, its first Principal, both nationally recognized pioneers in practical nursing education.

In those early days, the school geared its program toward "care of sickness in the home" and also "care of the home in sickness." The curriculum included classes in cooking and housekeeping. Gradually the emphasis shifted toward a more intensive training in patient care.

The real value of practical nursing came to be appreciated when World War II thinned the ranks of nursing. The postwar years found the need growing even larger as new medical centers sprang up across the nation. By that time states had passed laws requiring the licensing of practical nurses.

The greater focus on practical nurses and, in particular, their new role in a hospital setting spurred a complete restructuring of their basic training.

"At one time, for example, Shepard-Gill students received only five hours of instruction in pharmacology," said Mr. Nichols. "There were only about five medicines that a practical nurse could give in a hospital, and all were obtainable

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After becoming a licensed practical nurse, Kathleen Maguire studied further and earned RN credentials.

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Practical Nurses Give Vital Aid to Patients

(Concluded from Page 7)

over the counter. Today the practical nurse administers most prescribed medications, by mouth or by injection.

The MGH began a clinical affiliation with Shepard-Gill in 1952.

Miss Frances Gardella, Chairman of the Medical Nursing Service, General Hospital, describes LPNs as "an important part of our primary nursing team. In meeting the needs of our patients, the skills of the LPN are invaluable. In some instances, they comprise nearly 25 percent of the nursing staff on a patient-care unit."

In at least one respect, new Shepard-Gill graduates enjoy something of an edge over two-year college graduates just moving into full-time nursing positions and possibly even over the beginning four-year college grad.

"Our program was set up so that our students spent some 50 percent of their time at the hospital," Mr. Nichols explained. "I don't think the two- or four-year schools can claim such extensive hospital assignments. Such experience has afforded an opportunity for our students to develop and perfect their skills as rapidly as possible."

MGH nurses, whose qualifications in various specialties also cast them into the roles of teachers, frequently visited the Back Bay school to lecture. One day the students would learn about infection control; another time, how to care for the patient with abdominal problems who has had diversion surgery (colostomy) for the collection of body waste.

A survey of 592 students who graduated from Shepard-Gill between 1971 and 1983 showed that less than one percent failed the state licensing examination on the first try. Those who did fail received a passing score the second time.

The record is quite impressive considering that, as Mr. Nichols phrased it, "we're not talking about your fresh-out-of-high-school 18-year-old living at home with parents paying the tuition.

"The average age in this year's graduating class, which includes six or seven men, is almost 29. Some of our students are grandmothers. Most of the students are self-supporting."

Records indicate that three quarters of the students who enrolled in past years at Shepard-Gill completed the program. Nationwide only 65 percent of enrollees at schools of practical nursing graduate.

"One must bear in mind that many of these people have been away from an academic setting for a number of years," the Shepard-Gill director said. "Some find it difficult to get back to the books.

"In addition, many have family responsibilities that necessarily limit time commitments for study. Our experience has been that a majority of students who pull out do so for purely personal reasons, not because of academic failure."

Mr. Nichols paid tribute to his faculty, including 11 instructors, all registered nurses; a student counselor, and an administrative coordinator "for turning out practical nurses who are truly functional when they graduate, requiring a minimum of orientation."

He added:

"To my knowledge every Shepard-Gill graduate who wanted a job found one."

And speaking of jobs, what happens now to the Shepard-Gill staff as the school winds down? Thomas E. Rothwell, Director of Human Resources at the MGH, said every effort will be made to find new positions within the hospital for those who want to stay. For those who prefer to move on, the services of an outside employment agency will be made available.

However the school disbands, it will leave a legacy of 4,464 graduates, assuring that Shepard-Gill will long be remembered with affection. ■

Cheryl Alicea, LPN, double-checks the inventory on an emergency medical cart.

MGH News

Massachusetts General Hospital, Boston, Massachusetts

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Scientists Still Ask, "How Does Anesthesia Work?"

Reaching Out With Needed Medical Care

(Fourth article on ambulatory care)

The patient, in his late 70s, resided in a Chelsea, Mass., housing development for the elderly. Heart disease, degenerative arthritis, and diabetes imposed upon him a virtual bed-to-chair existence.

Although he lived alone, help was not far, however, when a crisis developed. A nurse visiting the elderly man found him suffering from a severely infected toe on his right foot.

She called an internist who went to the man's apartment and examined him. The doctor subsequently notified a general surgeon, who also made a house call.

Poor circulation in the patient's legs due to his diabetes contributed to development of the infection, and the toe had become gangrenous. Antibiotics and removal of unhealthy tissue controlled the infection, but a danger of its recurrence was posed by the gangrene.

A conference among the doctors and the nurse on the patient's general physical status led to a decision to remove the toe.

Using a local anesthetic, Dr. Frederick W. Ackroyd performed the amputation in the Surgical Day Care Unit of the MGH's Ambulatory Care Center. The patient returned home within hours, the surgery having eliminated the painful toe and the potential threat to his leg. Members of the medical team made several follow-up visits to the man's apartment until his foot healed.

The incident exemplifies the kind of community caring to which the entire staff of the MGH's Chelsea Memorial Health Care Center is dedicated.

Such caring carries special significance in this Boston suburb of 25,000 because

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Photo taken at the United States Weightlifting Championships shows Bob Wentlejewski's left shoulder dislocating because his left arm is too high and behind his head. See page 7 story on the benefits of new arthroscopic surgical techniques.

In the spring of 1846 at his country home in suburban West Needham, a promising young Boston dentist sought a chemical compound that could render his patients oblivious to pain.

The efforts of 26-year-old Dr. William T. G. Morton, which included experiments on goldfish, led just a few months later to the first public demonstration of anesthesia in surgery.

Since that historic event, which took place at the MGH, surgeons everywhere have come to regard the anesthesiologist as their indispensable right arm (*MGH News,* December 1977).

Equipped today with a wide variety of agents capable of inducing unconsciousness or otherwise suppressing pain, the highly trained anesthesiologist carries out duties with precision and safety; yet with no understanding of how anesthesia works!

In the MGH Department of Anesthesia, Keith W. Miller, Ph.D., a physical chemist and pharmacologist, is striving to solve the puzzle which has confounded researchers for 138 years.

Like Dr. Morton, the MGH investigator is working with fish.

"No one knows which protein in the brain is affected by anesthetics, but we wanted to study a protein which they do affect and which seemed to present a good opportunity for learning how the change takes place," said Dr. Miller. "The protein had to be very pure. We found that in electric fish we could obtain the right kind of protein, 10,000 times purer than any samples taken from mammals and identical to human protein."

The electric fish Dr. Miller settled on is from the skate family, a variety often snared in the nets of Gloucester, Mass., fishermen. Averaging a couple of feet long, the fish have a flattened body and

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EDITORIAL:

That Misunderstood Disease Called Hypertension

An estimated one in every four Americans has high blood pressure. And it can contribute to life-threatening disease. Yet hypertension confuses people perhaps more than any other major illness.

Patients get confused — even if they're among those who know they have the disease. A treatment-induced drop in blood pressure often results in patients deciding to stop taking medication. By stopping, they almost certainly face recurrence of the condition. To have hypertension generally means the need to take drugs for an entire lifetime. There are other factors besides drugs. How important, for example, is it to avoid salt? A recent study has seemed to obscure that question (see page 5 sidebar). And then there's the problem of how and even *if* to treat the borderline hypertensive. Even the physicians fall into different camps on that question.

Well if the doctors can't decide, how is the poor patient to know? It is precisely this sort of ambiguity that leads the public to lose confidence in doctors. In reality, however, there is little wonder that physicians disagree on such matters. This does not represent the first time nor the last that the *MGH News* points out that medicine is an art, not a science. The human body is a complex mechanism that took so very many millions of years to evolve. We are still learning how various cells interact, how organs manage their functions, etc. Because of our complexity as organisms we react differently to identical drugs, require varying amounts of sleep, and metabolize food according to our individual composition.

Amazing that in the entire time this planet has existed, we happen to be living at the very moment that medical knowledge is advancing by veritable explosions. No one person can digest but a fragment of the information published in scientific journals each month. No wonder then that the exploding information has left physicians in various states: knowing precisely what causes some ills and exactly how to prevent or cure them; aware of the cause but not the best treatment of other conditions; cognizant of how to treat and often cure many forms of cancer while being unable to more than guess the causes.

Under such circumstances, it is to be expected that there will be diseases for which the physician has no answers, merely questions. Hypertension more or less lies in the middle of this spectrum. Some forms have thus far defied explorations into a cause. While a pattern of treatment has emerged, there are still some areas in which the knowledge leaves room for shades of difference. But these gaps are narrowing, and a consensus is forming. Like so many other diseases, hypertension will yield to the combination of brilliant investigators — basic and applied — and new tools.

Key Brain Chemical May Help Answer Anesthesia Riddle

(Continued from Page 1)

pectoral fins that form wing-like lateral extensions, giving the appearance of a stingray.

Although the fishermen normally discard such a catch as trash, they were informed of the MGH work. Now when they collect a quantity of skates, they notify Dr. Miller, and he has the fish picked up the same day.

"We immediately remove the organ we're interested in, extract the protein we want, and then store the protein in much the same way that red blood cells are preserved," he said. "The fish are available to us only during the summer, but we can store the desired material through the entire year."

Studies directed by Dr. Miller in the MGH Molecular Pharmacology Laboratory and at a laboratory in the affiliated Shriners Burns Institute focus on the actions of an important neurochemical called acetylcholine.

Among other things, this compound transmits nerve impulses to muscle cells. The acetylcholine hits the receptor protein on an insulating membrane that surrounds each cell and opens a hole through the protein to let the nerve impulses flow into the cell. Anesthetics are known to depress the conduction of these signals.

Dr. Miller has a theory about how this disruption comes about.

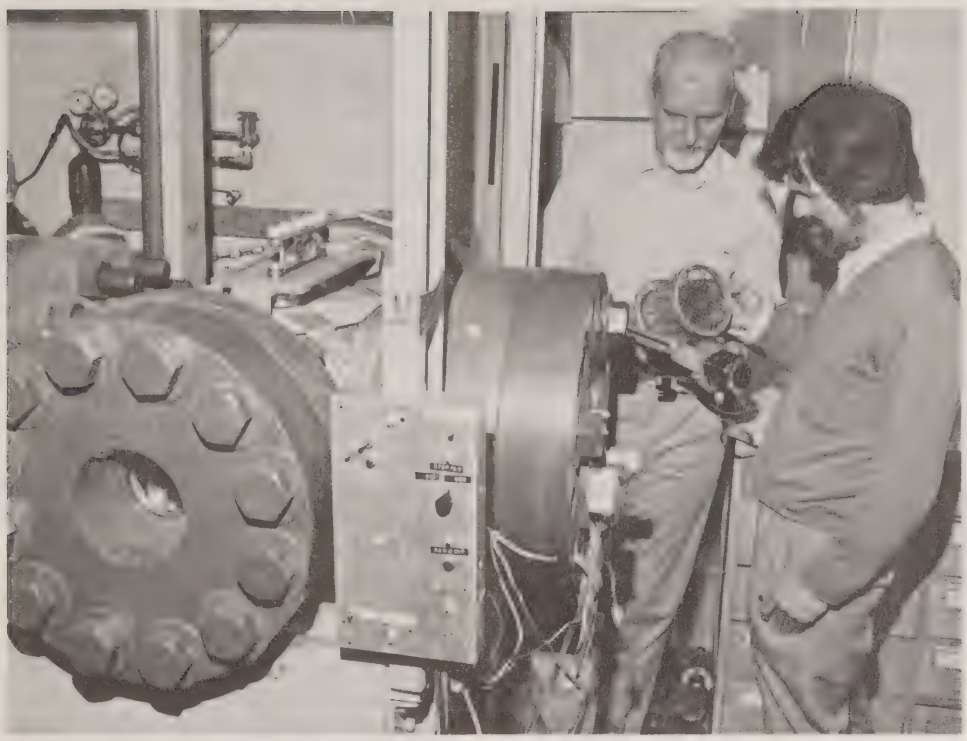
"Anesthetics dissolve in the lipids [fat-like materials] of the cell membrane. By expanding the lipids in the membrane, thereby altering its dimensions, the anesthetics change and inactivate the covering's protein components which control excitability. In other words, the proteins no longer function or 'fire' the way they formerly did."

Tests conducted with a high pressure (hyperbaric) chamber in the Molecular Pharmacology Laboratory support the contention that an expansion takes place in the lipids of the tissue.

After placing anesthetized mice into the

Photographs: Page 1, Bruce Klemens; pp. 3 (upper), 4, 5, 7, Myron Daniels; p. 3 (lower), courtesy of Dr. Keith Miller; p. 6, courtesy of Robert Tonner; p. 8, courtesy of Dr. Bertram Zarins

Drawing: Page 7, MGH Medical Art



Dr. Keith Miller, right, and Research Technician Paul Wankowicz prepare to use a special chamber to show how changes in pressure upon anesthetized mice can awaken them. The test is an important aspect of the MGH's anesthesia research program.

chamber, the Miller team found that by increasing the atmospheric pressure within the device they would awaken the animals. Because the compression reversed the lipid expansion, more anesthetic had to be administered to put the mice back to sleep.

"We won't necessarily understand general anesthesia from our studies of acetylcholine," said Dr. Miller, who earned his doctorate at Oxford University in England, "but if all general anesthetics do the same thing to that protein, then it would appear to be the mechanism that causes anesthesia.

"If, instead, we find that three or four anesthetics work and no others do, then we might have something that looks like a side effect."

He said it is just as important to understand how side effects develop as how general anesthesia itself is induced.

"We can select just about any general anesthetic to render a person unconscious," he stated. "All of these agents dissolve in lipids, but if you look at side effects, you find they vary."

Ether, the original anesthetic, not only brings on sleep, for example, but also relaxes muscles. Many other drugs do not offer that dual benefit. Thus, an anesthesiologist may use one drug to put a person to sleep and another to relax the muscles to facilitate the surgery.

The anesthesiologist knows by observation what effects various agents can have. A specialist tending a patient with a poorly functioning heart certainly would avoid any drug which could potentially disturb the rhythm of the heartbeat.

"The anesthesiologist prefers a separate agent for every activity he engages in because he can then control each variable independently," said Dr. Miller, who recently became Edward Mallinckrodt, Jr., Professor of Pharmacology in Anesthesia at Harvard Medical School.

Normally discarded by fishermen, the skate fish contains tissue (see arrow) which furnishes an important neurochemical for anesthesia studies.

Many people wonder why a so-called local anesthetic eliminates the sensation of pain in one particular area of the body but does not render the patient unconscious.

Dr. Miller explained that after numbing an area through direct injection, a local anesthetic, such as lidocaine or bupivacaine, works very slowly into the bloodstream. The drug wears off before the level in the blood gets very high.

In contrast, a general anesthetic, such as enflurane, is normally inhaled. It goes to the lungs, is quickly picked up by the blood, and seeks out the brain.

Sometimes just before a patient is wheeled into an operating room, the anesthesiologist will inject thiopental into a vein to bring about quick unconsciousness.

"Even a local anesthetic will affect the entire body if the needle pierces a vein," Dr. Miller said.

In cardiac surgery, where side effects can prove to be life-threatening, he stated, opiates "don't really have a bad effect on the heart, so one can avoid a lot of cardiac problems by using a very high dose of morphine to control pain and, in addition, a rather low dose of nitrous oxide, also called 'laughing gas,' as the general anesthetic."

In mentioning morphine, the MGH researcher pointed out that 20 years ago no one could explain why this drug controlled pain.

"Now through research we have a pretty good idea," he said, "and it has been discovered that there's a whole set of what are called endogenous opiates or morphine-like compounds in the brain doing various jobs. So a whole layer of physiology has been uncovered that no one was aware of just two decades ago."

To bring about a better understanding of how anesthetics turn off central nervous system functions, the National Institutes of Health is funding Dr. Miller's work. Assisting in the studies are Drs. Leonard Firestone and Barbara Dodson; Stuart Forman, an M.D. and Ph.D. candidate at Harvard Medical School; and Research Technicians Leon Braswell and Paul Wankowicz.

Dr. Miller and Professor Sheldon Roth of the University of Calgary in Canada also organized the Third International Conference on Molecular and Cellular Mechanisms of Anesthesia, held this summer in Calgary.

Convened every five years, the June meeting drew some 125 specialists from throughout the world to argue the merits of various theories. ■

On Treating Borderline Hypertension

As a major risk factor in the development of a stroke, heart attack, and kidney disease, high blood pressure clearly demands the close attention of health professionals.

But in the management of high blood pressure, or hypertension, what level of the disorder justifies the use of drugs, usually for the remainder of a patient's life?

How to treat the mild or borderline hypertensive perplexes countless physicians. Arguments weigh both for and against a drug program.

Of 60 million people in the United States with hypertension, some 40 million fall into the borderline category; that is, their diastolic pressure (the reading obtained as the heart relaxes between beats) ranges between 90 and 99 millimeters of mercury (mm Hg).

Physicians and nurses also record a systolic pressure signifying the force that blood exerts against arterial walls as the heart pumps. But since the systolic level may vary considerably from day to day and the diastolic appears to be more constant, doctors formulating a management program tend to focus more on the diastolic.

A few months ago, a special committee of the National Heart, Lung, and Blood Institute updated guidelines for the care of hypertensive patients. Many of the news media announcements confused the public. What the report actually advised was that physicians initially prescribe nondrug treatment for patients with mildly elevated pressure.

Dr. Randall Zusman obtains a blood pressure reading.

Such measures might call for weight loss, salt restrictions in the diet (see sidebar), greater physical activity, a halt in smoking, and cutting down on alcohol. If these measures fail, the committee said, doctors must initiate vigorous drug therapy.

"Nondrug therapy can be successful in patients with diastolic pressures between 90 and 104 millimeters of mercury if they make major changes in their life-style," said Dr. Randall M. Zusman, Director of the Hypertension Division of the MGH Cardiac Unit.

The success rate is not large, however. Dr. Zusman has found in his division that less than one-fifth of the borderline patients who altered their life-style were able to avoid medication or to discontinue drugs already prescribed. The principal gain realized among the remaining four-fifths of the patients was that many could get by on lower drug doses which resulted in fewer adverse side effects from the medicines.

Why the irregular response to the nondrug programs? "Since we are not sure what causes high blood pressure, people with that ailment may fall into different groupings," Dr. Zusman said.

"Genetics may be the most important factor behind hypertension. It's likely that if a person's parents had high blood pressure, he will too. And chances are that even if the patient is thin, avoids salt, smoking, and alcohol, and exercises regularly, he will have to rely on antihypertensive drugs."

Behavior modification such as biofeedback, a technique to help a person exert control over a functionally independent body system, has had limited objective evaluation in large patient populations. However, researchers have reported laboratory data that animals can be trained to both raise and lower their blood pressure in response to specific stimuli, suggesting that perhaps people could be similarly trained.

Dr. Zusman said the principal roadblock to resolving the drug question is that no studies have gone on enough years to demonstrate a long-term benefit from giving medicines to patients with diastolic pressures between 90 and 100 mm Hg.

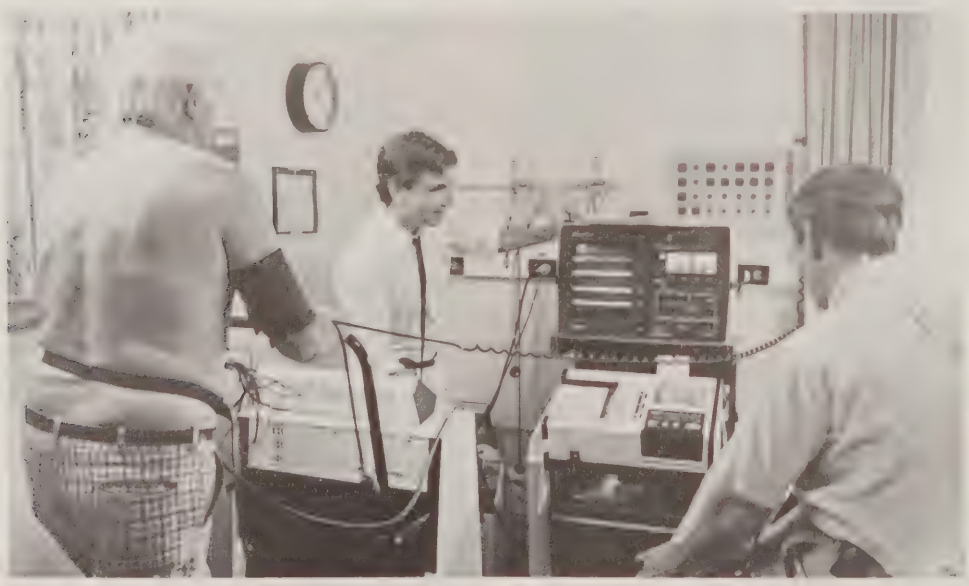
"The studies have been designed for short terms, perhaps 5 to 7 years," he said. "Investigations lasting a decade may be needed."

Drug opponents also argue that some studies indicate a greater incidence of complications from medicines. Following a basic medical rule to do no harm, the group contends that drugs should be held back until a patient's diastolic pressure reaches 100 mm Hg or the individual develops symptoms of other conditions such as coronary artery disease.

"I would argue that that's too late," said Dr. Zusman, who is also a cardiologist and Assistant Professor of Medicine at Harvard Medical School. "Earlier treatment might have avoided such problems. One never knows when subtle elevations of blood pressure are damaging a vessel in the body."

Because many antihypertensive drugs have side effects, people often weigh the benefits versus the disadvantages of the medicines. But the federal report on guidelines, based on advances over the past four years, pointed to a sharp broadening of available compounds.

Dr. Zusman estimated that in treating a



Howard Macomber, a patient of the hypertenison unit, undergoes a treadmill exercise stress test which evaluates his heart's blood supply. Dr. Carl VanKrimpen, right, and Cardiology Technician Gerard Cotter supervise.

patient for high blood pressure physicians now have access to some 200 medications. So it is possible, he said, to treat the vast majority of patients effectively without significant side effects.

Traditionally, the initial therapy involved diuretics that step up the body's excretion of fluids and salts. In some patients, however, diuretics may cause a loss of potassium, leading to muscle weakness or cramping and necessitating supplements. Cholesterol and blood sugar levels may also rise.

The federal guidelines support the use of beta blockers as optional treatment starters with diuretics to follow if needed. Beta blockers affect a central nervous system component related to blood pressure.

These drugs sometimes present their own set of side effects, e.g., fatigue, depression, sexual dysfunction.

"The challenge is to individualize the care of the patient," Dr. Zusman said. "If one drug causes a problem, the physician can switch to another, then another, until the objectionable effects have vanished."

Dr. Zusman said that physicians can control the condition of about 75 percent of hypertensive patients with initial therapy.

With difficult-to-treat patients, doctors can move to other types of drugs. One of these, called captopril, is even being used by many physicians as a first-step agent.

Captopril is a so-called "converting enzyme inhibitor." It prevents a hormone that has no effect on blood vessels from being converted into a powerful constrictive substance.

At the MGH and other centers, researchers are studying a dozen or so calcium channel blockers for potential use as vessel dilators. Their mechanism of action differs from that of other blood vessel medications, and the side effects are minor.

A nuclear gamma camera is used in a cardiopulmonary exercise to assess the heart function of hypertension patient Joseph Liz during peak activity from pedaling. Dr. Shunichi Homma conducts blood pressure checks during the study.

In seeking to individualize treatment, Dr. Zusman is conducting studies to learn whether certain drugs that lower blood pressure also improve the way that the heart works. The research deals with the responses of patients to an exercise schedule.

The results may make it possible to subclassify hypertensives according to cardiac abnormalities, some so subtle they do not even show up on routine tests.

Two cardiologist colleagues, Drs. William C. Carlson and David E. Guyer, work with Dr. Zusman. His staff also includes Dr. Robert M. Graham, a kidney specialist; Dr. Katherine K. Treadway, an internist; Dr. David J. Greenblatt, a clinical pharmacologist; and two research nurses, Donna M. Christensen, RN, and Elizabeth Federman, RN.

The hypertension unit offers free blood pressure tests to MGH employees and also invites their participation in the research projects.

Although the number of available medications and the extent of research make doctors optimistic in treating hypertension, they do face a dilemma.

"Only 50 percent of the patients adequately controlled will take their medications for longer than a year or so," Dr. Zusman said. "They feel well and think they are cured. Unless one's high blood pressure is caused by a tumor, a blocked artery, or some other condition that can be surgically corrected, there is no cure, only control." ■

Specialists Question Hypertension Study

A recently published investigation of essential hypertension underscores conflicting information which sometimes emerges from scientific studies, particularly on high blood pressure.

Writing in the journal *Science,* a team of researchers reported findings that suggest "diets low in sodium are associated with higher blood pressures, while high-sodium diets are associated with the lowest blood pressures."

This contradicts a long-standing belief that diets high in salt contribute to hypertension. Sodium is a major component of salt. Physicians customarily restrict salt intake in programs to lower high blood pressure.

Investigators from the Oregon Health Sciences University in Portland and from Temple University in Philadelphia authored the report in *Science.* The article prompted criticisms from a number of specialists who pointed out that it conflicts with literally hundreds of previous studies.

Among the critics was Dr. Randall M. Zusman, Director of the MGH Cardiac Unit's Hypertension Division. He considers the latest report to be far from conclusive because none of some 10,000 adults who provided data through interviews and medical examinations had a history of hypertension.

"Many people who don't have a problem with their blood pressure don't have to worry about their salt intake," Dr. Zusman said.

He also complained that the study relied on patients' memories of what they had eaten rather than on actual measurements of sodium excretion in urine.

"The report is interesting and controversial," the MGH physician said. "It probably will stimulate a large number of dietary studies with objective measurements and not recollections."

Dr. Zusman recommended that the public heed the published comments of Dr. William T. Friedewald of the National Heart, Lung, and Blood Institute. He said that the report "is an important piece of information for us to consider, but it has no implications for medical practice at this point."

In other words, the public should not begin showering their food with salt. ■

Chelsea Unit Holds Clinics for Elderly

(Concluded from Page 1)

the Massachusetts Public Health Department has ranked Chelsea 19th among the state's 351 cities and towns in terms of total needs. Chelsea's welfare rolls run long, and a third of its citizens are more than 60 years of age.

Dr. Ackroyd explained the center's policy on house calls:

"Very often a patient may fall into a gray area where he needs some type of surgery, but very fragile general health poses extra risks. By going out and seeing the patient, the physician and the surgeon can reach a meeting of the minds in terms of the trade-off of risks and benefits in doing or not doing a procedure. We try to give the patient the longest run for the shortest slide."

Doctors at the Chelsea center made more than 400 home visits last year. Every other Wednesday, Dr. Ackroyd also conducts a surgical clinic at the center to see new patients, follow up on others already treated, and meet with physicians who may seek surgical advice.

Clinics are held every other Monday at two developments for the elderly. A physician, nurse practitioner, and patient-care coordinator attend to the needs of as many as a dozen patients. Perhaps half the residents of the apartments require periodic medical assistance (*MGH News*, February 1977).

Last year 72,000 patients visited the center itself. An Emergency Ward, operated around the clock, recorded 17,000 visits while doctors' offices received another 55,000 patient visits covering virtually every medical specialty.

Numerous accounts are related of the interaction between the center's emergency services, its medical staff, and the backup care always available at the MGH.

Dr. Roger H. Sweet, Medical Director of the Chelsea center, told of an 82-year-old man who had an eight-month history of weak spells. Treated twice in the Chelsea Emergency Ward and on several occasions by the center's internists for his very low blood pressure, the patient entered the MGH for more extensive study.

"It turned out that a highly unusual pituitary tumor was affecting regulation of his body's electrolytes [mineral salts]," Dr. Sweet said. "With supplementation of the hormones that govern body fluid levels, the patient's condition improved to the point where he said he felt 10 years younger."

The man's own physician at the Chelsea center not only took part in his care at the MGH but also helped in arriving at the diagnosis.

Some 160 people comprise the medical and support staffs needed to provide the center's ambulatory services, including a diagnostic laboratory and radiology unit.

The MGH first appeared on the Chelsea scene in 1971 with the opening of a well-baby clinic. A shortage of doctors in the city had generated concern for young children in the community.

Federal grants helped to finance the child care, and later additional funding led to an ongoing program that assesses reports of child abuse and neglect and also offers treatment (*MGH News*, December 1978).

Gradually the care by what was then known as the MGH–Chelsea Health Center expanded to people of all ages. In early 1978, Chelsea Memorial Hospital, founded before the turn of the century, complained of insurmountable financial problems and asked the MGH to take over.

Already occupying the Chelsea hospital's old nursing residence, the MGH–Chelsea Health Center moved into the 60-bed main hospital quarters under an arrangement whereby the MGH would maintain the Emergency Ward and a 10-bed unit for holding patients overnight.

The overnight unit was closed in 1982, and the savings applied to other obligations of the center. "More often than not, the beds were occupied by elderly people who essentially needed nursing home placement rather than hospitalization," said Robert Tonner, the center's Administrative Director.

He said services were expanded on the basis of need. "Our goal over the years," he said, "has been to provide one-stop medical care as much as possible, but only very minor surgery and basic radiological procedures are done here. We rely on the MGH for the more sophisticated treatments."

Serving many low-income families has also meant the center's reliance on the MGH for financial support. A significant portion of the free care provided by the hospital is delivered through the health centers it maintains in Chelsea, Revere, Charlestown, and at Logan Airport in Boston.

The help extended by the hospital is repaid in ways other than financial.

"We do an enormous amount of teaching at Chelsea," said Dr. Sweet, who with Mr. Tonner also administers all of the other satellite operations.

"In addition to students from Harvard Medical School, we supervise and train house officers from the MGH and from the New England Deaconess Hospital in Boston, and there are trainees in social work, dietetics, psychology, speech, and nursing."

Already licensed as MDs, primary care house officers from the MGH have an opportunity to participate for a week in what Dr. Sweet terms a smorgasbord of experiences.

They might work one day in the Emergency Ward, then visit the internists to see what their day is like, then go out to make house visits with the physicians or nurses. Another day might be spent visiting work sites to check for occupational health hazards.

"Composed of many ethnic groups . . . beset with poor, and often fragmented, families . . . home to a high number of elderly, Chelsea's needs are many," Dr. Sweet said. "In helping to meet those needs, people in training positions are really learning what health care in a community is all about." ■

Dr. Frederick Rubin and Dr. Margaret Coyle, center, a primary care resident, look after a patient at a Chelsea housing development.

Arthroscopic Surgery Finds New Uses

Shoulder problems began plaguing Steve Nelson of the New England Patriots as far back as 1973.

His left shoulder dislocated that year, again in 1976, and five times in 1978. In 1981, he suffered another injury to the same shoulder, this time a separation.

The defensive captain of the professional football team was stymied from both types of injuries in April, 1982, when he arrived at the MGH.

Peering into the shoulder joint with an arthroscope, a thin optical instrument equipped with a cool (fiberoptic) light, the orthopedic surgeon spotted two tears in a ring of cartilage (labrum) which cushions the joint and facilitates shoulder movement.

After making an additional couple of tiny incisions (each about a quarter of an inch long) to insert special operating tools, the doctor cut away and removed the torn portions of the labrum.

"The surgery prevented cartilage from becoming jammed inside the joint as Steve moved his arm about," explained the surgeon, Dr. Bertram Zarins, who is the Patriots' head physician as well as Chief of the MGH's Sports Medicine Unit.

"Prior to the operation, Steve had trouble lifting weights to an overhead position. Removal of the torn cartilage enabled him to resume these exercises which in turn strengthened his shoulder muscles. The shoulder did not come out of the socket last season."

As orthopedist for the Boston Bruins hockey team, Dr. Zarins has also performed arthroscopy or corrective arthroscopic shoulder surgery on such players as team captain Wayne Cashman, who retired last year; Steve Kasper, and Rick Middleton.

The evolvement of arthroscopic techniques to treat shoulder afflictions parallels the course taken when orthopedic specialists first used the arthroscope to take care of certain kinds of injuries to the knee.

Dr. Dinesh Patel, an MGH orthopedic surgeon who heads the hospital's Arthroscopic Surgery Unit, estimated four years ago that only 200 of the country's nearly 13,000 orthopedic surgeons regularly employed arthroscopic operating techniques in their practice (*MGH News,* April 1980).

"Today that figure of 200 has risen to about 4,000," he said, "and I would estimate that 15 or 20 percent of these 4,000 surgeons now use the arthroscope in shoulders as well as knees."

The concept of direct visualization into a joint dates to 1918, but not until the late 1970s did arthroscopes attain sufficient technological advancement for such examinations.

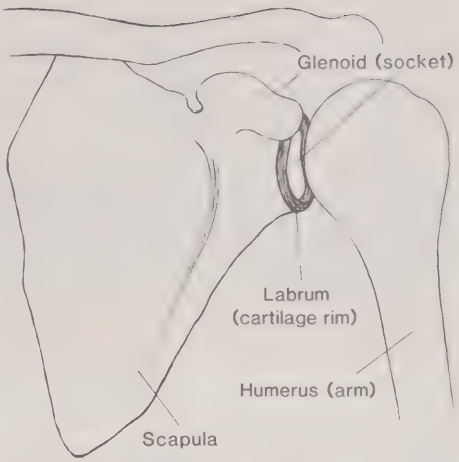
The ability to see exactly what was going on in the knee led to adaptation of the arthroscope for surgical repairs. No longer were large incisions needed to extract torn cartilage or loose bodies, such as bone chips. No longer was the patient incapacitated for a lengthy postoperative period.

As arthroscopic solutions to various knee problems blossomed, specialists naturally turned toward trying to achieve the same benefits with the scope in other joints. The shoulder was the next joint to be investigated because, like the knee, it is a large one.

"The diagnosis of the shoulder disorders can be complicated," said Dr. Zarins. "The joint is deep, buried under a mass of muscles, and is at a busy intersection of nerves and blood vessels traveling to the arm and hand.

"The risks of surgical intervention, therefore, are greater. But in the last three of four years the knowledge gained of arthroscopic capabilities has progressed to the point where surgeons have now come to rely on this technology routinely to diagnose and, very often, correct shoulder difficulties."

Just as surgeons employ the arthroscope in removing torn portions of a labrum, so can the instrument assist in the extraction of torn segments of a bicep tendon which may be pinching other structures within the joint.



View of a left shoulder joint

A bone fracture may cause chips to fall into the joint. The specialist can now remove them more easily.

Sometimes a tear develops in a rotator cuff, a series of shoulder muscles and tendons which connect to the arm bone and help to control movement of the limb forward, backward, and sideways. Baseball pitchers and tennis players are especially prone to such a problem. If the tear is inside the shoulder joint, the injury can be cleaned up by arthroscopic means. A small tear may then be able to heal on its own in time.

Most people have heard the expression

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Photos show how Dr. Dinesh Patel performs arthroscopic shoulder surgery guided by screened pictures of the shoulder joint's interior taken by a camera attached to the arthroscope. Doctors in rear are visiting observers.

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The Arthroscope: Invaluable for Diagnosis

(Concluded from Page 7)

"frozen shoulder." Although the condition orginates outside the joint, often from some unknown cause, the joint capsule becomes too tight, preventing the shoulder from moving.

"If physical therapy fails to provide relief, one can put saline into the joint under pressure and distend it, guided by the arthroscope, thus permitting better motion," said Dr. Patel.

As a diagnostic tool, the arthroscope has proved invaluable.

While competing for a national championship, an Olympic class weight lifter, Bob Wentlejewski of Waldwick, N.J., fractured the rim of a shoulder socket and ripped part of the labrum. Dr. Zarins, who served as head physician of the United States Olympic Team at the winter games in Sarajevo, removed bone chips and torn cartilage using arthroscopic surgery, and through the scope he was also able to determine exactly what he had to do to repair the damaged socket using conventional surgical techniques.

Of some 1,000 arthroscopic procedures performed at the MGH during the past year, Dr. Zarins estimated that between 90 and 95 percent involved the knee, 5 to 8 percent the shoulder, and 1 percent other joints, such as elbows, wrists, and ankles.

In dealing with the smaller joints, the arthroscope frequently is strictly a diagnostic tool. In many cases the size of these joints makes arthroscopic surgery impractical.

Removal of loose bodies is one exception. Dr. Patel told of a prominent Boston physician who had amassed more than a dozen bone slivers in an elbow as a result of sports injuries in high school and college.

Dr. Patel performed arthroscopic surgery using so-called regional anesthesia; that is, only the patient's arm was anesthetized. Instead of peering directly into the scope, the surgeon attached a hand-held color TV camera to the instrument and worked under the guidance of pictures relayed to a large screen. The doctor–patient was also able to observe the surgical procedure.

"The patient was not laid up at all by the operation," said Dr. Patel. "He had only three or four tiny puncture wounds to heal. He could write the same day if he wanted to, and in a week he could fully resume all normal activities."

Correcting an elbow problem requires considerable technical expertise. In addition to the small size of the elbow joint, three major nerves run right by the joint to provide sensation and motor function to the arm and hand. The nerves further complicate efforts to maneuver the scope.

A special room has been designated for arthroscopic work in the MGH Ambulatory Care Center's Surgical Day Care Unit. Mary Dutka, a staff nurse in the unit, directs the preparation of instruments and TV equipment, and she also instructs other RNs in these procedures.

Visiting surgeons from throughout the United States and many foreign countries frequently observe arthroscopic surgery at the MGH. Doctors have come from France, Spain, Italy, Germany, Switzerland, Mexico, Brazil, China, India, Australia, and South Africa.

"Arthroscopy has revolutionized the treatment of many knee and shoulder conditions," said Dr. Zarins, who with Dr. Patel also serves on the Harvard Medical School faculty. "The system is still evolving. As instrumentation improves, we think it will be possible to handle many more procedures using arthroscopic surgery that presently require conventional methods.

"Some things will be tried arthroscopically and found not to be worth the effort. On the other hand, some will stand the test of time, and the result will be improved patient care." ■

During recent MGH preseason physicals for New England Patriots football players, Dr. Bertram Zarins checked on defensive captain Steve Nelson's left shoulder which had undergone arthroscopic surgery.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 43 No. 7 October, 1984

A Brighter Outlook for Many Handicapped Children

Bunker Hill Center Readies for Added Charlestown Duty

(Last in a series on ambulatory care)

The tide is shifting on Boston's Charlestown peninsula, steeped in history but waging an uphill struggle on economic and other fronts.

The one-square-mile area bounded on three sides by the Atlantic Ocean and the Charles and Mystic Rivers once teemed with 44,000 residents, but the impact of poverty, unemployment, and poor housing has eroded the population to its present 13,000.

"Charlestown is beginning to turn the corner," said Robert Tonner, Administrative Director of the MGH's Neighborhood Health Center Group, among them the MGH–Bunker Hill Health Center on High Street in Charlestown. "Dramatic changes are taking place, including extensive property rehabilitation and a degree of new construction that the district has not experienced in two decades."

A long-time Charlestown resident, Mr. Tonner estimated that in the last few years the district has swelled by up to 2,000 people, many of them in a position to contribute to the area's economic well-being.

The influx holds special meaning for the MGH–Bunker Hill Health Center. Except for two or three physicians in private practice, Charlestown's only source of medical care within its geographical limits is the Bunker Hill unit.

"We're presently reviewing ways of serving this new and steadily growing population," Mr. Tonner said. "We're also planning to renovate the main floor of our building to enhance its efficiency and appeal."

(Continued on Page 2)

The MGH has introduced a special system to help surgeons analyze abnormal walking and devise corrective treatment programs.

Designed at Massachusetts Institute of Technology and enhanced by work at the MGH, the diagnostic aid evaluates and directs new therapeutic methods so that one day many children who are homebound with hip or leg infirmities may walk well enough to take advantage of opportunities now denied to them because of their handicap.

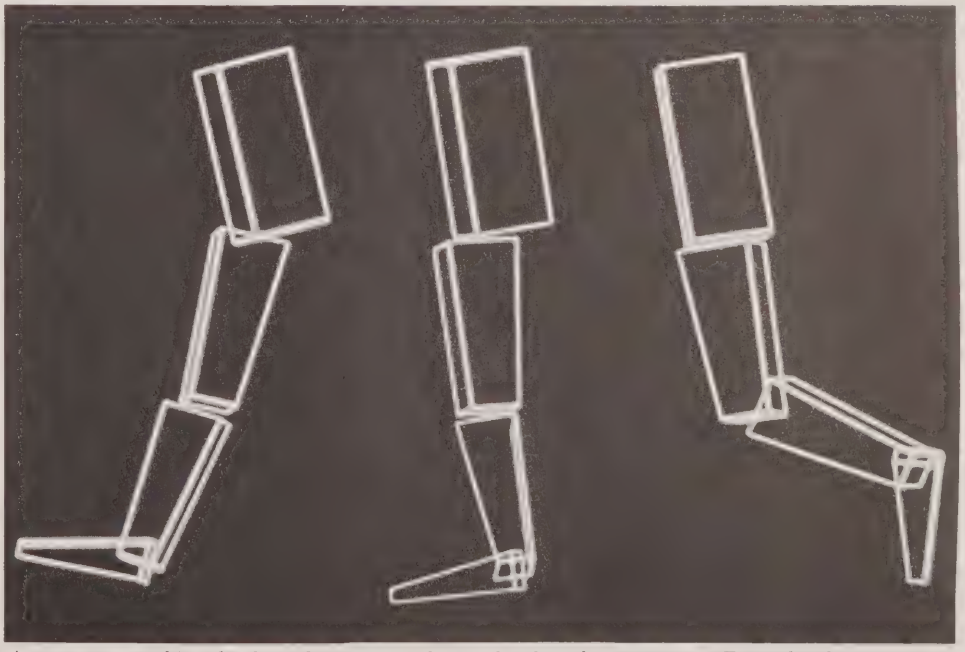
While testing a patient in the newly established MGH Biomotion Laboratory, the system employs infrared sensing cameras and lights to create on a computer screen a three-dimensional graphic display of the motion and the forces which the individual must use to take a complete stride.

One of the special features of the laboratory is the capacity to analyze both limbs simultaneously. This is especially valuable when dealing with handicapped spastic children whose walking patterns are very nonsymmetrical.

By analyzing the motion viewed in the computer display and the forces with which each foot strikes the ground, specialists can pinpoint where abnormal physical activity is originating.

With that precise information, the doctors can more readily formulate a remedy, perhaps involving such procedures as retraining, stretching, or transferring muscles or realigning bone, to facilitate walking. Also, they can monitor the patient's progress, and if improvement stops, new test results can assist the specialists in altering the care program.

(Continued on Page 4)



A computergraphics display of a patient's leg and pelvis during a step. From the three-dimensional images, a specialist can detect even the slightest rotational variations from normal walking patterns.

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EDITORIAL:

A New Dimension for Motion Problems

One of the problems that plagues many children is an inability to walk normally. An unusual gait singles out people whether they are children or adults. In youngsters a severe limp or similar difficulty brings another drawback. The handicapped child is unable to participate in sports or even many games. This incapacity brands the handicapped as "different" in the eyes of and as expressed by the lips of other youngsters who can be cruel.

To better treat walking disorders demands improved observation. Exactly what does the gait look like if broken down into its simplest elements. The human eye is unable to perceive precisely even with the aid of slow-motion film or videotape. That is because so many fragmented elements compose even a single step. Needed was a way to break down movement into its more basic components. Now a device developed in Sweden is proving so sophisticated that it is promising to permit a breakdown to such simple, primordial components that physicians should be able to better target their diagnoses. Once achieved, this improved view should allow treatments tailored to correct individual aberrant gaits. In other words the physician should be able to tailor the treatment to the little variances that individualize each person's problem. In fact the same principle should apply to handicaps so mild that no one knew they existed.

Take the person who tires readily. As any tailor knows, many normal people have one leg that is slightly shorter than the other. Even a little difference in height could affect a person's gait; perhaps enough to cause fatigue. Diagnosing and correcting the slight disparity through a modification of the patient's footwear could by late afternoon make the difference between energy and fatigue.

The new device promises to help diagnose motion problems of the hands as well. An informal team of MGH specialists has been analyzing the videotaped hand motions of professional musicians who have developed pain that compromises their performance (*MGH News,* June–August, 1982). Like the orthopedist trying to correct the gait disorders, the specialists interested in the hand problems have been limited by the inability to break down complex finger and hand movements. Access to the Selspot in the new MGH Biomotion Laboratory announced in a page-1 article should in time change that. Since the hand problems and motions appear to be as individual as the gait irregularities, the precise analysis made possible should at the very least provide new insights.

Former Charlestown Families Still Seek Bunker Hill Care

(Continued from Page 1)

Ever since 16 years ago when the MGH accepted the city's invitation to establish a health facility in Charlestown, the center has provided care for up to 70 percent of the neighborhood's residents.

Among the center's following are people who refuse to allow even distance to break old ties. "Many who received care here as children and who later established homes of their own in such suburban communities as Medford, Somerville, and Cambridge still come back for medical treatment," said Margaret Carolan, Bunker Hill's Manager. "And they bring along their own children."

One of four satellite operations founded by the MGH (the others are in Chelsea, Revere, and at Boston's Logan Airport), the Bunker Hill center occupies a two-story brick structure originally designated in 1929 as a city public health building. The construction was financed by the George Robert White Fund, which also helped to erect the MGH's 14-story White Building.

In backing the innovative Bunker Hill operation in 1968, the late Dr. John H. Knowles, then MGH General Director, wrote in the hospital's annual report that the health of a community must include consideration of its economic, educational, recreational, housing, and general social conditions.

"Inevitably," he wrote, "medicine must concern itself with the larger field of social welfare and develop a holistic concept of a community's health and thereby enhance the quality of life, to say nothing of the national welfare."

With a staff of 110 full- and part-time medical and support personnel, Bunker Hill provides a wide range of health and social services for individuals of all ages.

Originally, with a $400,000 federal grant and local matching funds, the center's primary aim was to offer comprehensive care to children under 21.

A spot-check among some 200 Charlestown children preregistered in 1968 for kindergarten and the first grade showed

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Photographs: Pages 1, 3, 5 (lower), 6 (lower), 8, Myron Daniels; pp. 4, 5 (upper), courtesy of Dr. W. Andrew Hodge; p. 6 (upper), 7, Thomas J. Croke

The MGH–Bunker Hill Health Center in Charlestown.

Since 1968, the MGH–Bunker Hill Health Center in Charlestown has provided care for up to 70 percent of the neighborhood's residents.

that only 68 percent had been immunized against diphtheria, whooping cough, and tetanus. Only 61 percent were fully protected against polio and 41 percent against measles.

That deficiency has since been remedied. A majority of Charlestown children are followed at the center.

"We routinely check their immunization records," Miss Carolan said. "In addition, our pediatricians and nurses go to the local schools to conduct physicals.

"Our pediatric staff also has close ties with the Charlestown Head Start Program and a variety of other community agencies."

The health center's dentists frequent the local schools. They hold periodic screenings for preschool children and those in the primary grades, and they also conduct a so-called "sealing" program to prevent cavities. The program involves use of a special compound to fill pits and fissures in teeth.

The Bunker Hill Health Center operates weekdays from 8:30 a.m. to 5:00 p.m., except to 9:00 p.m. on Wednesdays, and on Saturdays from 8:30 a.m. until noon.

Although the staff prefers visits by appointment, specific hours are designated for walk-in service. An emergency telephone service also is provided to handle any problems that may arise when the center is closed.

"We always have physicians on call," Mr. Tonner said. "Alerted on a beeper by a page operator, the doctor will telephone the patient, discuss the problem, and give advice. If the situation warrants, the physician will refer the patient to the Emergency Ward at the MGH, only a 10-minute ride from Charlestown."

The physician later will assume a more active role in the care of the patient, both at the hospital if the individual is admitted and during follow-up checks performed at the center.

The staff refers all patients needing surgery to the MGH. Although the center maintains an emergency treatment room, its main purpose is to provide speedy care of minor cuts, burns, and the like, and to stabilize a patient who requires transfer to the hospital.

Miss Carolan recounted an emergency some months ago when a woman in her 60s suffered chest pains at a shopping center. Rushed to the health unit in a private automobile, the woman on arrival was slumped over unconscious.

Physicians and nurses ran out to the car with all of the instruments needed to revive and stabilize her. Minutes after this was accomplished, an ambulance sped the woman to the MGH.

More typical of the center's activities is a program called WIC (Women, Infants, and Children), conducted there since 1976 in conjunction with the Department of Public Health. WIC offers nutritional assessment and counseling for pregnant women, newborns, and young children who are considered at risk and combines that counseling with food voucher assistance.

Unlike food stamps which do not restrict purchases, the WIC vouchers specify quantity and type of milk, juice, cereal, eggs, peanut butter, beans, and infant formulas.

Nutritionists evaluate participants every six months to determine further eligibility for the program.

It has been so successful that the enrollment now numbers about 2,000 served through the Bunker Hill Health Center and the Chelsea Health Center sites.

Bunker Hill soon will offer an obstetrical and prenatal plan in conjunction with Cambridge Hospital. Prenatal care will be provided at the health center, and a member of its obstetrical staff will deliver the baby at that hospital. A pediatrician subsequently will care for the infant at the

(Concluded on Page 4)

Jean Delaney, RN, checks an ear problem in the Bunker Hill center's Emergency Treatment Room.

Drs. W. Andrew Hodge, right, and Erik Antonsson help a youngster don special gear for a gait test.

Swedish Concept Inspired Gait Analysis

(Continued from Page 1)

The laboratory was made possible by grants from the Edwin Phillips Trust and by the work and support of Drs. W. Gerald Austen, Chief of Surgical Services; Donald N. Medearis, Jr., Chief of the Children's Service; Michael G. Ehrlich, Chief of Pediatric Orthopaedics; and William H. Harris, Chief of the hospital's Hip and Implant Surgery Unit and Director of Orthopaedic Biomechanics.

The United States Olympic Team uses a somewhat similar type of analysis to help its track members perform better.

The concept of an infrared sensing camera and light system began about 10 years ago. Swedish engineers developed the camera system to collect movement data of whatever kind and named it "Selspot." In the years that followed, work has been done to refine the system's capacity for the study of human locomotion and mobility and to analyze walking in patients undergoing rehabilitation.

Much of this development has occurred at M.I.T. under the direction of Bioengineering Professor Robert W. Mann. Several graduate students, most recently Dr. Erik Antonsson, have devised elaborate computer programs called TRACK which together with the Selspot cameras produce the most powerful, flexible, and easiest to use gait analysis system currently available. Dr. Antonsson is now Technical Director of the MGH Biomotion Laboratory.

"The system can analyze a child's walking pattern quickly and within minutes can demonstrate the mechanics of the child's gait," said Dr. W. Andrew Hodge, an MGH orthopedic surgeon and Clinical Director of the laboratory.

An engineering student at the University of Illinois for three years before deciding on a medical career, Dr. Hodge became associated with the clinical gait lab of Presbyterian St. Luke's Hospital in Chicago after graduating from Rush Medical College, also in Chicago.

When Dr. Hodge came to Boston in July of 1982 to work with Dr. Harris as Harvard Research Fellow in Orthopaedic Biomechanics at the MGH and with Professor Mann as a Research Associate at M.I.T., work was begun at M.I.T. to apply the Selspot/TRACK system to patients from the MGH.

The TRACK technique involves attaching arrays of tiny lights to various segments of the leg or pelvis instead of using conventional single markers.

"This was aimed at allowing a more complete analysis of the involved segment's motion, whether it be the foot, the shank, the thigh, or the pelvis," said Dr. Hodge. "The arrays of lights permit quantification of not only bending action but also alignment, and that means a much better description of the type of motion which is occurring."

Since then, with the goal of helping MGH patients, Drs. Hodge and Antonsson, with the supervision of Dr. Harris, have further refined the analysis

Bunker Hill Offers Health Screenings

(Continued from Page 3)

hospital and on a regular basis at the center.

For the past 13 years, Bunker Hill has sponsored a summer camp for boys and girls between 5 and 16. Situated in Westwood, about 15 miles from Charlestown, the day camp accommodates about 90 children, including youngsters from Chelsea.

Many of the participants come from disrupted families, have a history of poor school attendance or performance, have developed impulsive or aggressive behavior, or are at risk for other problems.

Directed by Tom Panowicz, a clinical psychologist and former Paulist priest, the camp employs rewards and affection to heal emotional scars and wounds and fosters positive behavior through new peer relationships.

To help make people more conscious of their health status, the Bunker Hill center occasionally sponsors health screenings.

At the invitation of the National Park Service, such a program was held recently at the Charlestown Navy Yard, where the *U.S.S. Constitution,* better known as *Old Ironsides,* is berthed.

Sixty percent of the employees at the Navy Yard, now a National Historic Park, participated in the program. Screening tests were given for eye and ear problems, hypertension, mouth cancer, excessive cholesterol, and diabetes. A registered dietitian offered information on nutrition. A slide presentation dealt with women's health issues.

Two staff psychologists and a psychiatric nurse practitioner also discussed alcoholism and how to handle stress.

Not far from the screening site, some 300 acres of former Navy Yard property are undergoing private development. Apartments and condominiums are being created from old buildings, and town houses are going up, complemented by a 500-foot marina that may triple in size.

Even as a look at *Old Ironsides* recalls the past, a glance in another direction raises hope for Charlestown's future.

In terms of health care, the Bunker Hill Health Center intends to keep pace. ■

system by doubling the equipment to record the movement of both legs at the same time.

"One of the things we've noted in abnormal gait is that it is very asymmetrical," said Dr. Hodge, who is also Clinical Instructor in Orthopaedic Surgery at Harvard Medical School. "Using a unilateral analysis system, it is impossible to accurately predict at any one instance what is occurring on the opposite side for a particular gait cycle. The abnormal limb significantly affects the behavior of its opposite side."

The MGH Biomotion Laboratory equipment, therefore, includes four infrared sensing cameras and two ground force plates, all feeding pertinent data into a computer which organizes and displays the information on a screened image.

The installation of these 18- by 22-inch force plates proved to be an engineering challenge. With the laboratory situated in the basement of the MGH's Sleeper Hall, the plans called for installation of a four- by six-foot granite platform at floor level to contain the plates.

As Dr. Hodge assists in the demonstration, his young volunteer steps in front of infrared sensing cameras and onto force plates for recording of gait data.

"The system can analyze a child's walking pattern quickly and within minutes can demonstrate the mechanics of the child's gait."

– Dr. Hodge

"The platform had to rest on an absolutely rigid foundation, completely free of any outside influences," Dr. Antonsson said. "Unfortunately, the construction workers ran into mud and water as they dug. They even encountered a chunk of wood from an old dock or piling. [The land on which Sleeper Hall sits was much closer to the Charles River at one time than it is today.]

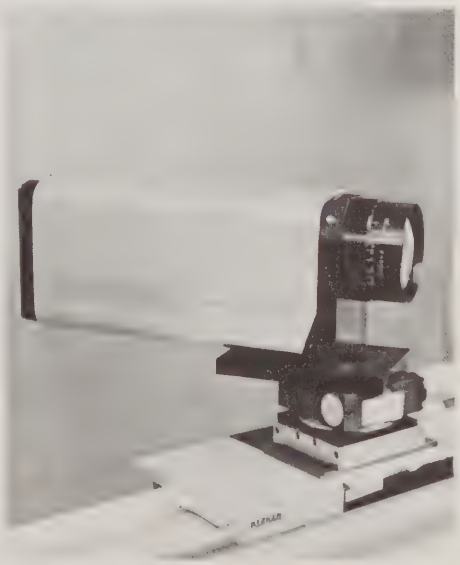
"The construction company rigged a three-story derrick outside the brick building and a 10-foot block and tackle derrick inside the 30- by 40-foot laboratory. Working together, the derricks installed five pilings, plunging them to a depth of 17 to 20 feet. The supports were then interconnected with a metal framework, and cement was poured."

Thus the platform sits on a foundation so firm that the plates can precisely measure the foot forces at any instant from "heel strike" to "toe off."

Since the Biomotion Laboratory can accommodate ambulatory children of any age, the force plates are adjustable to a stride length proper for any particular age.

The laboratory operates in close collaboration with the MGH Pediatric Rehabilitation Unit, also financed by the Edwin Phillips Trust (*MGH News,* May 1984).

Children with cerebral palsy – most of them patients of Dr. Ehrlich – comprised the first group chosen to undergo the complex analysis.



Four of these cameras are used to record the simultaneous movement of both legs.

"The gait of the cerebral palsy child is so abnormal and asymmetrical that it is hard for the physician's eye to assess what is happening," said Dr. Hodge.

"Dr. Ehrlich has combined certain surgical and physical therapy procedures for these children and believes that with this new diagnostic capability many of these youngsters stand to benefit considerably."

The visual image that appears during an analysis differs from that which a television camera would project. A television picture can be operated both forward and backward, but the viewer always occupies the point where the camera was positioned.

In contrast, with just a turn of a knob, the computergraphics image can be studied from the front, back, or off to the sides. In addition to the analysis equipment providing bilateral advantages, the display of limb segments with cubic images (quadrahedrons) allows precise depiction of three-dimensional limb rotation.

Dr. Ehrlich said the use of the MGH Biomotion Laboratory "will enable us to measure scientifically the progress of children undergoing treatment. This should allow us to refine our care to the benefit of the patients. This new program thus presents us with an exciting opportunity." ■

Team physician Bertram Zarins tends an injured player during a time-out in a Patriots' game.

Guarding the Health of the Patriots

Two big buses pulled up at the MGH on successive Saturdays this summer and seemed none too large for some of the riders.

Like 6-foot, 7-inch, 288-pound Brian Holloway; 6-foot, 5-inch, 270-pound Ken Sims; and 6-foot, 4-inch, 273-pound Ron Wooten.

The New England Patriots had arrived in two contingents for annual physicals in advance of their 1984 National Football League season.

Arriving at the hospital's Ambulatory Care Center at 8 a.m., the players – 110 in all – spent several hours undergoing an array of medical tests, including blood analyses, electrocardiograms (EKGs), and X rays.

The physical evaluation had to be thorough because football is more than just a contact sport; it is a collision sport. In each game they play, six or seven Patriots are hurt, half of them seriously enough to sit out the rest of the contest or even longer.

The MGH provides total medical care for the team. Dr. Bertram Zarins, an orthopedic surgeon and Chief of the hospital's Sports Medicine Unit, is serving his third season as the Patriots' head physician. Associated with him in active roles with the team are two MGH colleagues, Drs. Adolph M. Hutter, Jr., a cardiologist, and James J. Dineen, an internist.

Because the athletes must be able to absorb the rigors of a game, the doctors pay special attention to each player's heart during the preseason examinations.

If the regular physical or an EKG detects even a slight cardiac problem, further more sophisticated diagnostic procedures are undertaken, such as a treadmill stress test or echocardiography, a form of ultrasound particularly helpful in studying the structure of the heart.

"Most well-conditioned football players have an unusual-looking electrocardiogram which would be abnormal in another person but normal for the athletic heart," said Dr. Hutter.

Thinking not only of a player's present health but his long-term future as well, the doctors also scrutinize for evidence of a tendency toward high blood pressure, high cholesterol, and diabetes.

During training camp sessions when a player may have to work out twice a day in scorching weather, he tends to consume heavy amounts of salt to avoid dehydration. In treating high blood pressure, most physicians prescribe low-salt diets.

The athletes also eat a great quantity of steaks and other red meats.

"It's one thing when the individual then proceeds to burn up thousands of calories on the football field," said Dr. Dineen. "But what happens after a career ends when this energy-demanding activity slackens? Continuation of the same eating habits might spell trouble. So it's vital to keep close tabs on a player's overall health status."

Dr. Zarins begins his season in late July when the team launches a five-week training stint at Bryant College in Smithfield, R.I. He visits the camp several times each week to evaluate player injuries and prescribe care. Two Fellows, orthopedic surgeons doing additional postgraduate training and research at the MGH, assist in the care of the team.

Ron O'Neil, new as head trainer after many years with the Philadelphia Eagles, and his assistant, Jim Pluemer, who is also a physical therapist, attend all practice sessions. After a player is hurt, the trainers not only carry out the doctors' prescribed treatment but also work to

Deborah Cronin, RN, tests the circulation in the left leg of Patriots' all-pro punter Rich Camarillo, injured in a preseason game with the Washington Redskins.

In left photo, Head Trainer Ron O'Neil of the Patriots confers on the sidelines with tackle Lester Williams, who has an injured left hand. At right, fellow tackle Brian Holloway, also with an injured hand, is checked by Assistant Trainer Jim Pluemer.

rehabilitate and recondition the player for the speediest, safe return to the sport.

During the Patriots' 4 preseason exhibition games and 16 regular NFL contests, half of them on the road, Dr. Zarins stands ready on the sidelines to respond to any need for medical assistance. Drs. Hutter and Dineen usually take turns as a second staff physician on the scene.

Other MGH specialists regularly attend the games as spectators but make their services available when needed. They include two neurosurgeons, Drs. Nicholas T. Zervas, Chief of the Service, and Paul H. Chapman, who are consulted from time to time on head or neck injuries.

"Evaluating an injury on the field can be difficult," said Dr. Zarins, who is also the orthopedist for the Boston Bruins hockey team and was chief physician for the 1984 U.S. Winter Olympic Team. "Anyone who leaves a game with a head or neck injury will automatically stay out for the rest of the game. On the other hand, a bruise or muscle soreness that does not affect full function would not necessarily keep a player out.

"Evaluating an injury is complicated by the fact that most injuries really don't hurt very much when they occur. With a sprained ankle, for example, pain and swelling will not usually develop until an hour later and will not reach a peak until perhaps another 12 hours go by. The player, unaware of the severity of his condition, may want to go right back onto the field."

The bottom line, said Dr. Zarins, is that "if we felt there would be risk of further injury, we would not return the player to action."

Drs. Hutter and Dineen commonly deal with chest wall problems. A player who takes a sharp blow to the chest may develop labored breathing. The condition of his heart, lungs, and spleen is quickly assessed before he is allowed back into the game.

Many athletes continue in action despite some punishing knocks. "If one said, 'Anybody who is hurt cannot play,' you wouldn't have a team," Dr. Zarins stated. "The ability to play with some pain really points to the leaders of the team."

A few of the players deemed toughest by the doctor in terms of ability to continue in a game even though bruised are quarterback Steve Grogan, all-pro offensive guard John Hannah, linebacker and defensive captain Steve Nelson, starting center Pete Brock, and defensive end Julius Adams.

Criteria on whether to remove an injured player for medical reasons vary, depending on his position and the requirements of that position.

For example, a wide receiver such as Stanley Morgan must be able to sprint down the field and, if necessary, cut and change directions very quickly. Center Pete Brock's job, on the other hand, is to snap the ball and then hold his ground. If Steve Grogan injured the hand on his throwing arm, this would obviously affect his ability to play as compared with a player in a different position.

Sullivan Stadium, the Patriots' field in Foxboro, Mass., houses extensive facilities for the care of the players. The locker-room area features a medical examining room, portable X-ray and developing equipment, facilities for acute treatment and long-term rehabilitation, and a fully equipped weight room for conditioning.

During the regular season, Dr. Zarins visits the trainers' area the middle of every week, sometimes twice a week, to check on injured players. His orthopedic Fellows also make frequent visits.

The team's trainers put in long hours, from 8 a.m. until late evening. During preseason practice at Bryant College, the hours run even longer, often from 6 a.m. until midnight.

In addition to their locker room, visiting teams at Sullivan Stadium have their own trainers' room. They travel with their own medical equipment but, when necessary, use the Patriots' X-ray facilities. And as in the case of a Patriot, if a player for an opposing team requires hospital attention, that player is brought to the MGH.

During each game an ambulance is parked at Sullivan Stadium with emergency medical technicians ready to use resuscitation and life support systems or simply to transport a player to the hospital for further testing and evaluation of a questionable injury.

A large team of MGH consultants – two for every specialty – stands behind the Patriots' primary doctors. Dr. Zarins listed Dr. Richard J. Smith, Chief of Hand Surgery in the Orthopaedic Service, as probably the busiest consultant in terms of treating the football players.

"We rely on Dr. Smith a lot because hand injuries crop up fairly frequently," Dr. Zarins said.

Despite the obvious hazards of professional football, Dr. Dineen said the dedication of these athletes toward perfecting their skills and performing at their best is incredible.

"If people elsewhere put out as hard in their professions as these young men do," he said, "this would be a much better world." ■

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A Wish Comes True for Many Diabetics

Ice cream for an insulin-dependent diabetic?

The idea sounds illogical. Without even knowing how harmful ice cream may be, most health professionals exclude it from the diets of diabetic patients.

Recently, however, an MGH study, reported in the *Journal of the American Medical Association* (JAMA), sparked a rethinking about the sweet most sorely missed by so many diabetics.

Dealing with the effects of ice cream on 10 patients who require insulin daily, the report said in part:

"A modest amount of ice cream may be included in weight-maintaining diets of insulin-dependent diabetics. Small doses of rapid-acting insulin prevent any adverse effect of the ice cream on blood glucose control."

Dr. David M. Nathan, Director of the MGH Diabetes Clinic and Diabetes Research Center, stressed that patients should not regard the findings as a blank permission slip.

Principal author of the research report, Dr. Nathan said any decision on including ice cream in a diet should be reached in consultation with one's physician. Since diabetic conditions vary, treatment must be individualized. Overweight diabetics who need to lose weight, the doctor said, should probably avoid the calorie-rich food.

The MGH research followed work by others which demonstrated that various carbohydrate foods generate different glucose responses following a meal. A certain quantity of potato, for example, would have a very different glucose effect than an equal amount of rice. In addition, the glucose rise from pure sugar varies, depending on whether it is ingested alone or in a mixed food.

Fat and fiber content in foods, as well as the kinds of sugars used, all figure in the rate at which the body absorbs the sugar.

"Most of the earlier studies had been conducted with diabetics who do not require insulin or with nondiabetics," Dr. Nathan said. "We wanted to study the difficult diabetic, one who has no insulin of his own, because it would seem that any effect of food on blood sugar would be magnified in these patients."

Dr. Nathan and his team, including Dr. John E. Godine, Research Nurse Chris Gauthier-Kelley, and Dietitians Debra Kawahara and Maryanne Grinvalsky, recruited 10 volunteers from the MGH Diabetes Clinic.

Five were under intensive insulin therapy, three with insulin pumps and two with at least three injections of the drug per day. The other volunteers were receiving conventional treatment, one or two insulin injections daily.

"When our patients consumed approximately a cup of ice cream each, we found that their blood glucose would undergo a greater increase than expected for the Type Two [noninsulin-dependent] diabetic," Dr. Nathan said. "But the rise was not extraordinary. With an advance dose of rapid-acting insulin given a half hour before the ice cream was eaten, the expected glucose rise was reduced by more than 50 percent."

Whether this advance dose is mandatory remains to be determined in long-range studies already initiated by Dr. Nathan, who is in addition an Assistant Professor of Medicine at Harvard Medical School.

He and his colleagues also seek to learn whether insulin-dependent diabetics can safely include a modest ice cream snack with meals on a regular basis.

"If over a six-month period the patients can maintain good blood glucose control and not be affected by weight changes or the intake of added cholesterol, I think we will have made an important addition to our earlier findings," Dr. Nathan said.

Physicians may prefer to keep ice cream off a diet pending results of this long-term study of the product's effects.

In an editorial accompanying the research article in JAMA, a leading nutritionist, Dr. David J. A. Jenkins, of the University of Toronto, wrote that some sugar-containing foods taken in moderation may greatly enhance the acceptability of the diabetic diet. But he cautioned against ignoring foods, such as beans, peas, and lentils, which have little or no impact on glucose profiles. ■

With proper safeguards, many insulin-dependent diabetics can enjoy ice cream in modest quantities.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 43 No. 8 November, 1984

Early Care Often Controls Renewals of Depression

At any given time, nine million Americans—four percent of the country's population—suffer from major depression.

But an MGH psychiatrist and investigator of depression believes that action by patients themselves can check what has been labeled as "the most widespread psychiatric disorder" in the United States.

"The key is early recognition and rapid intervention," said Dr. Martin B. Keller, Director of General Psychiatry Practice at the MGH. "If people previously treated successfully for depression sought immediate help upon recognizing signs of another episode, it is quite possible that more than half of those patients would be able to alleviate or even block that new episode of depression."

A psychotherapeutic effort should be made within the very first few weeks, he said, to find out what is bothering the patient and why and to offer counseling. Involving oral communication, psychotherapy may include support, suggestion, reeducation, reassurance, clarification, or interpretation.

"If that doesn't work and a full picture of depression is developing," the doctor said, "I would then institute antidepressant medication before that depression has become severe enough to impair the patient's functioning.

"There is compelling evidence that antidepressant medication, lithium and electroconvulsive therapy [E.C.T.] may all be effective in treating emerging depressive symptoms or a full-blown depressive syndrome. The indications for these treatments should be considered carefully by psychiatrists for every patient who becomes depressed."

Everyone suffers transitory feelings of sadness or discouragement, but this is not the depression that physicians refer to

(Continued on Page 2)

Shifting Muscles to Aid Disabled Hands

Have you ever placed an outstretched finger across the open palm of a newborn? Invariably, the infant's own fingers will wrap around yours.

Over time, as the baby finds functional uses for its hand, the instinctive grasp reflex, or clenching, passes.

Not everyone is so fortunate. In many cerebral palsy (C.P.) patients, even adults of higher than average intelligence, the grasp reflex persists, but the digit lying across their palm is their own thumb which can provoke the fingers to automatically close down.

Striking around the time of birth, often due to such factors as prematurity, an unusual fetal position, bleeding within the skull, or lack of oxygen, C.P. damages parts of the brain controlling the body's motor or muscular system (*MGH News,* March 1979).

The thumb-in-palm deformity results from a muscle imbalance precipitated by a form of C.P. known as spastic hemiplegia. Muscles on the outer side of the thumb are weak while those on the palm side are overly strong. Acting like a tight rubber band, the strong ones draw the thumb inward. With the thumb not only in the way but also causing the fingers to clench, the moderately to severely affected patient derives very limited hand use.

Often there is also a muscle imbalance in the wrist which magnifies the problem. An excessively tight muscle under the wrist can tug the hand downward and pull it toward the little finger.

At the MGH and other major medical centers, orthopedic surgeons have devised techniques to counter the imbalances in suitable patients making the affected hand more useful and better appearing.

"Three things can be done," said Dr. Richard J. Smith, Chief of Hand Surgery in the MGH Orthopaedic Service. "One is a tendon transfer. Another is a procedure called a 'muscle slide.' And the third is a fusion or stiffening of a joint."

One of the tendon transfers, which Dr. Smith helped to develop, involves surgically shifting a tight tendon (the tissue connecting muscle to bone) from a thumb's inner side to its outer side, thus giving the thumb the added power it needs to straighten. This balances the strength on both sides of the thumb.

The shifting of one tendon does not adversely affect the work it was originally

(Continued on Page 4)

His right hand disabled by cerebral palsy, the man on the left, a young lawyer, overcame a social handicap through surgery. It enabled him to shake hands.

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EDITORIAL:

Depression: From Abe Lincoln to 1984

Each of us during our lifetime tries to carve out as happy an existence as we can. That is why severe chronic depression has to be one of the scourges that afflicts people. It can be so disabling as to prevent a person from holding a job or functioning even in a less challenging situation. However, an individual can be so motivated as to function well despite the depths of depression. Like a depressed Abraham Lincoln somehow able to guide this nation through one of its most critical crises.

Most, if not all, of the nine million Americans suffering from depression at any given time, of course, work in more mundane jobs than the Presidency. But perhaps they are less motivated, therefore, to carry on despite the great weight that burdens their shoulders. For them new help may be drawing closer. During the last five or so years psychiatry has improved its methods to scrutinize depression. As a result, a study in which the MGH is playing a leading role is turning up important data. The investigators have learned: how to predict which depressed people are most likely to have the long drawn-out problem; which are more likely to have a recurrence if they do recover. The multicentered study has shown that anyone depressed for several months before seeking treatment is likely to remain depressed for a long time unless aggressive treatment is undertaken. On the other hand, as a page 1 story describes, the patient seeking psychiatric help within two weeks of the onset of an episode has a much better opportunity for recovery. The chance of someone seeking unnecessary treatment for depression is considered very small. One of the worst outlooks turns out to be for the patient who blends severe manic (abnormally high emotions) and severe depressive moods. In fact, anyone with one full episode of mania has about 19 chances in 20 of experiencing a second one and maybe 9 chances in 10 of an episode of depression as well.

What relationship does a person's job have to depression? The study demonstrates that the category of job is far less important than the worker's attitude toward his work. People with personalities that are vulnerable to depression tend to become unhappy about their employment and go into depression.

How about the effect of socioeconomic conditions? Are the wealthier more or less likely to be depressed than poorer people? Here the answer seems less clear. "Lower" socioeconomic status is apparently conducive to other psychological problems like drug and alcohol abuse. When such abuses appear, they tend to predominate and to mask an underlying depression. The opposite may hold true for "upper" socioeconomic status. With less incentive to abuse drink and drugs, a depressive episode would stand out more clearly. Is it better to drink to excess or be addicted to drugs and in the process disguise depression or to wear one's depression on one's sleeve? It's obviously better to be happy. Studies like the one described in the page 1 article should eventually move the nine million depressed more in that direction.

When Depression Necessitates Help By Professionals

(Continued from Page 1)

when they speak of mood disorders or affective illnesses.

The depressed person who needs professional help is someone who has felt in a "down" mood for two weeks or longer and, in addition, has experienced at least four of the following symptoms:

Loss of appetite and weight or excessive appetite and weight gain, difficulty in sleeping or excessive sleeping, loss of interest or pleasure in usual activities, inability to concentrate, excessive worrying or feelings of guilt, physical agitation, fatigue without a physical basis, and suicidal thoughts.

Using those criteria, researchers have shown that between 20 and 26 percent of women and between 8 and 12 percent of men in the United States have endured at least one episode of major depression during their lifetime.

"Those percentages represent only the threshold for single episodes of depression," Dr. Keller emphasized. "What portion of the men and women in the general population suffered frequent episodes which are severe or chronic depressions we don't know yet. Obtaining this knowledge should be a high research priority."

The longer a person remains depressed the more difficult recovery becomes, said Dr. Keller, who also serves as a principal investigator of a federally sponsored multicenter study of depression. The investigators also include, from the MGH, Dr. Gerald W. Klerman and Philip W. Lavori, Ph.D.

Writing in the *American Journal of Psychiatry,* the team reported that of 316 patients who came under study because of a major depressive disorder, 80 (or 25 percent) had a preexisting chronic minor depression lasting at least two years.

Regarding this phenomenon which was first identified by this group and designated as "double depression," the authors wrote that the longer the patient remains chronically ill after recovering from the major depression the greater the likeli-

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Photographs: Pages 1, 4, 5 (lower), courtesy of Dr. Richard J. Smith; p. 3, courtesy of Elena Volante, McLean Hospital; p. 5 (upper), courtesy of Dr. Bertram Zarins; p. 6, courtesy of Boston Bruins

Drawings: Page 4, Paul Andriesse; pp. 7, 8, Marcia Williams

The longer depression continues, the more difficult recovery becomes.

hood that a relapse will preempt complete recovery.

"One of the significant happenings in psychiatry during the past four or five years has been the mounting awareness of the widespread nature of these chronic depressions and that very often they underlie a major depression," Dr. Keller said.

"Prior to this, when people with a major depression sought help, health professionals often failed to recognize the preexisting low-grade depression, which may in some cases be enmeshed in the patients' personality. Without this awareness, practitioners did not know what baseline to get the patients back to."

In another study, published in the *Journal of the American Medical Association* (JAMA), the investigators reported on 97 patients treated at five university medical centers. Each patient had suffered an episode of a major depressive disorder but had no history of chronic minor depression.

After two years of follow-up, 20 (or 21 percent) of the participants still had not recovered. Most of the 20 continued to have severe depressive symptoms during that period.

The recovery rate among this study group was highest during the first three months of treatment. After one year, recovery dropped sharply.

A finding that particularly surprised researchers was that married patients had more difficulty overcoming their depression than did single patients.

"We don't understand why," said Dr. Keller. "Epidemiological studies tend to suggest that one is more likely to become depressed if single, separated, or divorced than if married. What we found, however, was that once depressed those who are married were more likely to do worse than the unmarried. We have a new series of studies under way at the MGH to try to learn the reason."

In another MGH study, Dr. Keller and his colleagues are delving into evidence that depression runs in families. The data indicate that more than 30 percent of children with a parent who has an affective disorder will develop a depression by late adolescence.

The risks of impairment in such children mount if the parent's depression is severe or chronic or if the parents' marriage becomes endangered.

"Until five or 10 years ago, depression was not recognized in children," said Dr. Keller, who is also Assistant Professor of Psychiatry at Harvard Medical School. "Only recently have people begun to define the condition in youngsters, to initiate research, and to begin appropriate treatment protocols."

In another JAMA article, Dr. Keller wrote that depression in general is often underdiagnosed in the community by general practitioners, psychiatrists, and other mental health professionals, and that when a diagnosis is made, patients are apt to receive inadequate treatment.

"For example," he wrote, "despite the fact that controlled trials have indicated relatively little value for antianxiety medication [minor tranquilizers] in the treatment of depression, these drugs were more commonly employed than the antidepressants in a sample of 217 patients suffering from a major depressive disorder."

Randomized controlled trials have shown that antidepressive drugs, particularly those known as tricyclic medications and monoamine oxidase (MAO) inhibitors, as well as E.C.T. are highly effective for acute instances of depression.

Lithium carbonate and the tricyclics also are considered effective antidepressants for long-term treatment to prevent recurrence and relapse.

Although depression constitutes the principal problem in affective illnesses, a very small percentage of patients suffer from what is termed a bipolar disorder: depression together with mania or mania alone.

Dr. Keller described mania as a very severe psychiatric disorder that in almost every instance requires vigorous treatment with mood-affecting drugs and often leads to hospitalization.

"A manic episode," he said, "is characterized by either a feeling of euphoria that is far out of proportion to what is going on in the person's life or a sense of irritability and anger.

"The elation and anger usually occur together. For example, if the happy manic is pressured or cornered in any way, what seems to be a state of extraordinary high-spirited wellness can rapidly change to hostility, even paranoia [a condition marked by delusions of persecution or grandeur]."

Lithium has proved of great help in treating bipolar disorders. Studies of patients during one year of lithium treatment showed a 50 percent reduction of recurrences of mania or depression, and new episodes that did occur were less severe.

"Psychiatric researchers have been very successful in demonstrating the effectiveness of certain drugs, combinations of drugs and psychotherapy, and other techniques in obtaining relief from severe mood disorders," Dr. Keller said. "There have not yet been any controlled clinical [patient care] trials on treating chronic depressive disorders. These are just beginning." ■

Improving Hand Use Through Surgery

(Continued from Page 1)

designed to perform since bending a thumb brings into play a total of five muscles. Some can compensate for the surgical change.

On the underside of the wrist, two muscles control the downward movement of the hand. In another type of tendon transfer, if one muscle is too tight, the surgeon can move it to the topside of the wrist, thereby allowing the hand to be in a more normal position and improving its function, strength, and appearance.

As a result of feedback of sensation from the hand, the brain adjusts automatically to the new work assignments given the muscles or tendons.

When muscles controlling the fingers require loosening, surgeons often choose the muscle slide operation. This involves detaching the muscles from their connection to an arm bone and letting them slide down the bone to a new position closer to the wrist.

Sometimes in trying to help a patient with a severely bent wrist, the surgeon fails to find any muscles strong enough to reposition the hand. This leads to consideration of the joint fusion technique.

"With the wrist fused in a normal position, the patient can get much better function from the fingers," Dr. Smith said. "And while the wrist will no longer bend up or down, the patient's forearm will still be able to rotate the hand."

Of every 1,000 live births in the United States, six babies are found to have C.P., and the failure of certain muscles to coordinate—usually on one side of the body—occurs in 65 percent of these infants. Only about 10 percent of the spastic patients qualify for muscle rebalance surgery.

Dr. Smith, who has performed more than 200 such operations, cited several reasons why a candidate might have to be turned down.

In addition to even the strongest muscles being too weak to work properly, sensation in an arm may be so poor that the patient tends to ignore the limb. This problem may persist even after a rebalance of muscles.

C.P. sometimes inflicts severe mental retardation which makes it difficult, if not impossible, for a patient to cooperate in a necessary postsurgical program. Dr. Smith emphasized, however, that many patients, even though somewhat retarded, have done very well after correction of a deformity. The extent of retardation, therefore, requires close evaluation.

Orthopedic surgeons have devised a number of techniques to counter imbalanced hand muscles making the hand more useful and better appearing.

And although some patients have obvious handicaps, they still may function so well that it is best not to interfere.

The thumb-in-palm deformity

In consultations with patients and their families, Dr. Smith stresses that while significant improvements in a hand may result from surgery any attempt to restore perfectly normal function to a severely involved hand is bound to be disappointing.

He also prefers to delay a hand muscle rebalance operation until a child reaches about the age of 5. This is because some children improve spontaneously. "Abnormalities may become evident at 4, 5, or 6 months of age," he said, "and then gradually much of this may pass."

The surgeon must be cautious, however, in delaying surgical repair. Too long a wait may result in the child ignoring the hand completely.

Determining the surgical needs of a cerebral palsy patient is particularly difficult because the individual's pattern of motion and the way the affected limb looks may change during the day. When the patient becomes tired or nervous, such as during examination in the doctor's office, the muscles frequently tighten.

Often it takes someone outside the family to really discern what the patient has the most difficulty doing.

In evaluating patients, Dr. Smith sends many of them to physical and occupational therapy where, in calm surroundings, young children can play games and adult patients can engage in such normal daily activities as eating, dressing, opening cans, and using tools. An hour-long videotape captures the movements. The doctors and other health professionals involved can later study the tape to better

A rearrangement of muscles and tendons in the misshapen hand in the left photo produced the normal looking, better functioning hand in the right picture.

The Bruins Depend Upon MGH Care To Remain Fit

Professional ice hockey is one of the fastest team sports in the world, demanding extraordinary balance, coordination, and skating skill.

As players streak across a hockey rink at speeds up to 35 miles an hour to fire the hard-rubber puck into a net at 90-plus miles an hour, the potential for injury is high.

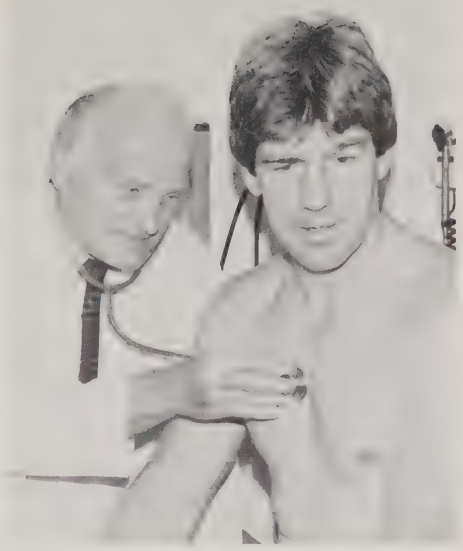
Players crash into the boards (the fence around the rink) or into each other, feel the sting of slashing hockey sticks in scrambles for the puck, get hit by the flying disc itself, and take hard falls on the ice.

"The rate of serious injuries in professional hockey, however, is not as high as many people believe," said Dr. Earle W. Wilkins, Jr., an MGH surgeon. He has also served as head physician for the Boston Bruins of the National Hockey League (N.H.L.) for the past 16 years.

"Of close to 20 Bruins in a game, one may see virtually all reporting to the team's Medical Room during or after the contest," the doctor said. "But that doesn't mean they had just been hurt.

"The players might want a part of the body, such as a wrist or knee, taped for added strength. Or they might seek an application of ice to soothe a previously bruised area."

Dr. Wilkins, who is also Chief of Emergency Services at the MGH, said an injury that keeps a player out of a game occurs more often in professional football than in hockey.



Dr. Earle Wilkins checks Bruins captain Terry O'Reilly in a preseason examination.

Last season, 33 injuries led to Bruins missing 269 games, but a broken collarbone was the only fracture. "Of every 20 X rays taken, perhaps one will reveal a break," Dr. Wilkins said. "There are seasons when one doesn't encounter a single fracture."

When the Bruins report to training camp in Danvers, Mass., in mid September, they are already well-conditioned physically. Trainer and physical therapist Jim Kausek makes certain that they have guidelines to get the most benefit from whatever exercise they engage in during the off season, whether the activity be cycling, running, swimming, lifting weights, etc.

During preseason physical examinations given at the MGH, particular attention is paid to body fat, muscle strength, and areas that may have been injured or operated on in the past. The checkup also ensures that the player does not have an underlying medical problem such as hypertension, a heart murmur, or deficient vision.

During the month-long training season, which includes 11 exhibition games, the players engage in daily stretching exercises before practice sessions. Kausek adds a weight training program on days when the team spends less time on the ice.

The regular season calls for 80 games, half at home. If the team reaches the Stanley Cup play-offs, the potential exists for another 26 games.

In addition to Dr. Wilkins, MGH medical personnel providing services to the Bruins include a fellow general surgeon, Dr. Ashby C. Moncure, and two orthopedic surgeons, Drs. Carter R. Rowe and Bertram Zarins.

Both a general surgeon and an orthopedist attend each game at Boston Garden to treat any injured Bruin or visiting player. A dentist, Dr. Richard L. Miner of Brookline or Dr. Robert J. Thomas of Wellesley, also attends to provide his services, if needed.

Studies have shown that two-thirds of all injuries in professional hockey involve the head and face. Sticks are the most common cause, followed by pucks, then slamming into the boards.

Cuts account for more than half of the head and facial injuries and generally do not incapacitate a player. Three years ago, in a play-off game against the New York

(Continued on Page 6)

judge what are the functional problems and how best to improve them. The tapes are often shown to the patients and their families and discussed with them.

Sometimes a child will use a handicapped arm at home but, because of self-consciousness, not at school. Dr. Smith, who is also Clinical Professor of Orthopaedic Surgery at Harvard Medical School, told how surgery on a hand deformity helped some patients to develop socially. One child became a member of a school orchestra because she could now hold a trumpet. Another joined a bicycle club since he could now grasp the handlebars of a bike. And a 24-year-old Ivy League law student with governmental aspirations became able for the first time to shake hands. ■

In addition to finger and thumb repairs, the hand at left needed a rebalancing of wrist muscles to make it more normal (right photo).

Professional hockey players such as Bruins forward Nevin Markwart, shown here, go into action without a face protector although most hockey injuries involve the head.

Sticks Pose Biggest Peril in Hockey

(Continued from Page 5)

Islanders, forward Terry O'Reilly, now the Bruins captain, had 12 stitches to close a facial cut and immediately went back into action. The cut reopened, was resewn, and again he returned to the game.

Because of the preponderance of injuries above the neck, the Bruins have long felt that their medical team should be directed by a general surgeon.

Dr. Wilkins had ample credentials for the post, having tended to the medical needs of Harvard's freshman, junior varsity, and varsity hockey teams for a dozen years. He also "doctored" the school's lacrosse and soccer teams.

(During undergraduate days at Williams College, Dr. Wilkins played football, baseball, and basketball. In 1965, *Sports Illustrated* honored him for his contributions to sports since college days by naming him to the magazine's silver anniversary All-America football team.)

Dr. Wilkins estimated that during a season the Bruins receive care for more than 90 percent of their injuries in the team's own Medical Room.

Situated only a few blocks from the Boston Garden, the MGH itself provides whatever special attention a player needs, such as an X-ray or other diagnostic procedure or a treatment that only a hospital can offer.

Dr. Zarins, who is also head physician of the New England Patriots football team, described shoulder and knee injuries as the most common orthopedic problems in hockey.

Last year, for example, shoulder injuries (separations, dislocations, or collarbone difficulties) accounted for more than half of the 269 games missed by Bruins. Injured knees were responsible for 60 games missed.

"Shoulders and knees are the most vulnerable contact points in a collision," Dr. Zarins said. "Every year we also have a few players injured by direct hits from a puck. A puck once fractured an ankle of defenseman Mike Milbury, and another shot broke one of his kneecaps."

Over the years increased recognition of the need for protective gear has dramatically decreased hockey injuries.

When Dr. Wilkins first joined the Bruins organization, he proposed that the National Hockey League require its players to wear helmets, a rule already in force in college ranks.

The league's governors voted against the proposal. Almost 10 years elapsed before the N.H.L. passed the helmet rule. Players already in the league when the regulation took effect have the option not to wear the headgear.

"Goalies have not always worn helmets or face masks," said Dr. Wilkins. "When I joined the Bruins, there were three or four goalies in the league who never wore a helmet or a face mask. They changed their practice through common sense rather than by direction. They simply got tired of being cut so often."

All college hockey players must wear face masks, and Dr. Wilkins sees that policy advancing to the professional level "not by regulation but by the players themselves voluntarily wearing the masks."

Trainer–physical therapist Jim Kausek fits defenseman Ray Bourque with a helmet equipped with a mask to protect an already injured jaw.

Bruins Wives Help Children's Service

In appreciation of MGH medical care to the Boston Bruins, wives of team members chose the hospital to benefit from their charitable activities.

Earlier this year, the Bruins Wives Association presented the MGH's Children's Service with a check for $38,000, raised from a sale of Bruins calendars and from proceeds of a dinner dance and fashion show.

Among the wives who helped organize the activities were Donna Kausek, wife of trainer and physical therapist Jim Kausek; Debbie Milbury, wife of defenseman Mike Milbury, and Lucy Crowder, wife of forward Bruce Crowder.

He also cites a need for better protection of the shoulders, but, he said, the players hesitate to wear anything that might hamper their maneuverability.

Jim Kausek said that in the past hockey equipment manufacturers have not supplied shoulder products that offered adequate protection for professional players. "We have had to get what was available," he said, "and then modify the item where necessary."

He indicated that more suitable shoulder equipment is beginning to appear on the market.

The changing style of play in professional hockey is also resulting in fewer people becoming hurt.

"The emphasis is now more on fast skating and better passing and less on body contact," Dr. Wilkins said.

This shift has resulted from international play. European hockey teams rely on speed and skill rather than on brawn, and they have proved that they can win.

Dr. Zarins found this to be true in 1979 when he accompanied the United States Olympic Hockey Team to a tournament in Moscow and again last year when he served as chief physician for the United States delegation at the Winter Olympic games in Sarajevo, Yugoslavia.

"The style was far different from the 'knock 'em into the boards' technique so prevalent in North America," Dr. Zarins said. "This bruising style of play would never succeed on an international level. By basing player recruitment purely on skill, there would be less intimidation and fewer brawls and injuries at games." ■

Flatulence: Often a Self-Created Problem

A cardiologist recently referred an elderly woman to the MGH Gastrointestinal (G.I.) Clinic after she complained of a heavy pressure sensation in her lower chest.

The 70-year-old patient feared that the pressure indicated a worsening of her heart's ability to get enough blood (angina pectoris), one of several conditions for which the cardiologist was treating her.

Suspecting that the latest problem did not involve the heart at all but aware of the woman's deep anxiety, the physician suggested a G.I. checkup.

Dr. James M. Richter, Chief of the G.I. Clinic, said the patient recalled earlier episodes of accumulated air or other gases in her stomach or intestines (flatulence) as well as mild diarrhea. He ordered a breath test using lactulose, a form of sugar (*MGH News,* November 1982). The result was positive, revealing bacterial overgrowth in the patient's upper small intestine. Low doses of antibiotics overcame the problem.

Dr. Richter described flatulence, characterized by bloating, belching, or rectal passage of gases, as one of the most common gastrointestinal complaints. In most instances, a general physician can readily evaluate and manage the disorder, but flatulence sometimes masquerades as another condition, e.g., angina, gallbladder disease, or ulcers.

In earlier years, flatulence was so commonly linked with gallbladder disease that flatulent patients almost routinely underwent gallbladder X-ray tests, and if stones were found, surgery followed to remove them.

"We now realize that the coexistence of gallstones and flatulence is most often a fortuitous association," Dr. Richter said. "Any stones present may be completely asymptomatic and not require surgery [*MGH News,* March 1984]. One can interpret the situation much more accurately by recognizing flatulence for what it really is."

Flatulence occurs when a person swallows an excessive amount of air or has within his body some unexplained sensitivity to air; when the diet includes foods containing nonabsorbable carbohydrates that bacteria in the colon thrive on, and when the intestinal tract is sluggish, leading to spasms which slow the movement of food and build pockets of trapped gas.

People usually swallow air unconsciously through such actions as eating or drinking too fast, talking while eating, consuming carbonated beverages, chewing gum, or sucking on hard candy. Individuals who are stressed tend to breathe more deeply and sigh more, thus also encouraging a greater intake of air. Patients with chronic lung disease are typically short of breath and gulp air frequently.

Treatment for flatulence generally calls for either a change in habits, if air swallowing is responsible, or dietary restrictions, if certain foods are the culprits.

"The average person belches 14 times a day, and most flatulent patients don't belch any more often," said Dr. Richter. "They simply have the sensation of needing to belch and get little relief from doing so.

"Belching often occurs after meals because as food fills the stomach, air ingested while eating collects at the top of the stomach. The transient relaxation of a ring of muscle [sphincter], which normally guards against a backup of the stomach's contents, then allows the air to escape as a belch."

Air reaching or developing in the small intestine may also be expelled through the mouth. An ineffective bowel movement is usually responsible for the backup of gas from areas of the intestine known as the duodenum and the jejunum.

Disordered motility in the intestines also creates a feeling of bloatedness even though the volume of gas present may not be excessive.

While oxygen and nitrogen comprise the principal gases entering the body through air swallowing, three others—hydrogen, carbon dioxide, and methane—are produced in the colon or large intestine.

The hydrogen and carbon dioxide result from the bacterial fermentation of undigested food. Bacteria also produce methane but do not depend on ingestion of nonabsorbed matter. Studies indicate that the tendency toward methane production is an environmentally acquired, familial trait.

The gases themselves do not create the most disturbing feature of flatulence, the odors. These come from digestive wastes

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Lactose in Food May Cause Flatulence

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and other elements of the diet.

The diagnosis of flatulence hinges heavily on a history obtained from the patient and the ruling out of other possible afflictions through an absence of anatomical evidence.

Treatment for flatulence generally calls for either a change in habits, if air swallowing (aerophagia) is responsible, or dietary restrictions, if certain foods are the culprits. Martha Lynch, a registered dietitian and nutrition manager of the MGH's Phillips House and Baker Memorial Building, cautioned against heavy eating when under stress. "People diagnosed as air swallowers often find that when they have a lot of anxieties flatulence can be avoided or eased by reducing the quantity of food consumed at one sitting," she said.

Aerophagia patients should not only shun carbonated drinks but also foods that have been blenderized, such as milk shakes. The whipping process incorporates air into a product.

And people should cultivate the habit of eating slowly. Those who eat too fast, Miss Lynch said, tend to gulp air.

Doctors hearing complaints of intestinal gas often order a test for possible intolerance for lactose, a milk sugar found in many foods (*MGH News,* November 1982). In the United States, 15 percent of the adult white population and 85 percent of the black and oriental populations must avoid lactose because of malabsorption that can result in abdominal pain, diarrhea, and flatulence.

Fruits, such as apples, melons, and prunes, and vegetables, such as broccoli, brussels sprouts, cabbage, cauliflower, and beans, fall into the gassy food category.

"This is not to say that one should never eat any of these foods," Miss Lynch stated. "Reactions among individuals differ greatly. People should try to note their own responses and then, if necessary, reduce or eliminate certain items.

"I favor restricting diets only if it really has been demonstrated on successive occasions that a problem exists."

Patients who undergo body waste diversion surgery (a colostomy) usually represent an exception. Their diets generally exclude many gas-producing foods in the initial weeks after the operation because if an intolerance occurs the patients become very sensitive to their condition. Gradually, the patients can evaluate restricted items and determine for themselves whether to keep them on their diet.

Dr. Richter, who is also an Instructor in Medicine at Harvard Medical School, recommends treating intestinal flatulence with a diet rich in bran or with a laxative (Metamucil) which provides a nonirritating bulk in the G.I. tract.

Resistant to bacteria, both the bran diet and the laxative promote a return to normal bowel movement. "The patient has the same amount of gas," the doctor said, "but it passes along with fewer pockets developing, and the patient experiences less bloating."

If further treatment was necessary, Dr. Richter said he would turn to so-called antispasmodic or anticholinergic drugs which reduce contractions of the intestines, thereby relaxing the bowel. He might select dicyclomine hydrochloride (Bentyl) or a combination of several compounds (Donnatal), which includes the sedative phenobarbital.

Although no one knows exactly what causes intestinal spasms, also referred to as irritable bowel syndrome, most people with flatulence do not worry about it; that is, until they learn that a neighbor, friend, or relative has developed abdominal cancer.

Dr. Richter said that if a physician takes enough time to carefully describe the problem and how to manage it by simple means, the explanation can be quite reassuring. ■

Consuming more suitable foods and in less of a hurry might have avoided this embarrassment.

MGH News

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Lasers Provide Important Help in Spotting Disease

Nurses Show Caring in Many Ways

Death. So inescapable, so inexplicable.

Ask one hundred people what death is, and prepare for 100 different responses. There are just no right or wrong answers. Death is, and will always be, one of the true enigmas of life. And also the most emotionally painful.

Someone once said that when your parent dies, you've lost your past, and when your child dies, you've lost your future. But a group of Neonatal Intensive Care Unit (NICU) nurses at the MGH has gotten together to help parents come to grips with their future, a future without a loved one.

Thus, the NICU Bereavement Group was born, one of the few—perhaps the only program of its kind in the country—operated by Neonatal Intensive Care nurses. Begun in January of 1983, the 12-week program provides emotional support to parents whose children have died while patients in the Neonatal Intensive Care Unit.

In most instances these babies have been at the MGH all but a few hours of their short lives. All were born in other hospitals. Most were brought to the MGH within 24 hours in special ambulances, many of them high-risk infants barely clinging to life. (Despite the high risk, in 1983 babies in the NICU had a survival rate of 87 percent.) And according to Bernadette Reilly-Smorawski, a nurse in the Unit and one of the organizers of the group, the fact that the NICU was virtually the only home the babies knew was a very important consideration in involving

(Continued on Page 4)

The loss of a child is one of the most traumatic experiences any family can go through.

A laser-equipped instrument gives promise of helping physicians to both diagnose disease and monitor treatment.

Separate MGH trials with the device, called a flow cytometer, already have indicated major roles for it in the care of patients with kidney transplants, bladder cancer, and bone tumors. Infectious disease specialists also regard the machine as a potentially valuable tool in probing AIDS (Acquired Immune Deficiency Syndrome).

The basic principles of flow cytometry date to some 25 years ago when electronic cell counters were devised to rescue laboratory technicians from what often was termed one of the most tedious jobs in science.

Until then, to check the blood of a patient, a technician peered through a microscope at a stained slide and, with a handheld counter clicking away, tallied and typed a hundred blood cells. Abnormal size, shape, or quantity spelled possible disease.

Repeated again and again, the diagnostic routine frequently led to early burnout among laboratory personnel.

Although electronic cell counters are used in almost all hematology laboratories today, the technology has taken a giant leap forward at the MGH and a number of other medical centers.

Incorporating not only the basic principles of automated cell counting but also such fields as laser technology, computer science, monoclonal antibody (M.A.) production, and fluid mechanics, flow cytometry can analyze the physical and biochemical properties of individual cells at a rate of up to 30,000 a second.

As a very finely focused laser beam passes through cells flowing by one at a time in a tube, the beam causes an excitation or "light scatter." A series of optical

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EDITORIAL:

Compassion + Training + Skill

Tiny children brought to the MGH's Neonatal Intensive Care Unit are as sick as a premature baby can possibly be. Nevertheless medical care and technology save most of them. That is little consolation for the parents of the few who do not make it.

A group of MGH nurses with compassion in their hearts to match their training and skill have joined together to support the grieving parents. The 12-week program carries parents through their most trying period and starts them on the road back toward a normal life.

The fact that nurses from the MGH Children's Service conceived and created this program surprises no one who knows them. As far back as February of 1974, *Boston Magazine* praised the Children's Service as a model for the affection, care, and concern lavished on children and parents alike. After commending the MGH's written philosophy as unique and "as a model of enlightenment," the article continued that parents of patients in the MGH Children's Service "are regarded as essential to their children's care and are welcome round-the-clock even in the intensive care unit, which, in other hospitals, usually limits parents to five minutes visiting per hour. The newborn nursery, housing a dozen very sick infants, is an exceptional example of concern for patients as family members.

"It is surprising how well family-centered pediatric care flourishes here, (in the entire MGH Children's Service) even in the absence of specially designed facilities. A deep commitment to family participation overrides the limits of space and gives the lie to the frequent lament of other institutions that 'we just aren't set up for it.'"

Yes, anyone who has observed the MGH pediatric nurses knows. They each struggle with patients housed in small rooms crowded with modern technology. Despite the lack of space, the nurses encourage parents to sleep in those rooms. The presence of the parents further compromises the ability of the nurses to move about. But they know, oh how they know, the importance to the child of having a mother or father nearby. By involving the parent in the care, they also lend him or her an emotional crutch. But there is no wonder why the nurses who devote so much time to the children in their units long for the day that the hospital's Capital Campaign succeeds. A new children's division designed for the bulky instruments of modern technology and for adequate room for parents will follow. And then the patient rooms will match the skills and compassion of the nurses, doctors, and many other caretakers who dedicate their careers to sick children.

Laser Beam Probes Key Facets of Cells

(Continued from Page 1)

sensors called photomultiplier tubes picks up these reflections, translates them into blips, such as on a radar screen, and transmits these signals to a computer system for analysis. The computer later produces an image or graphic display on a screen depicting the number of cells and other characteristics.

In addition to counting and classifying cells, regardless of whether they are from blood, connective tissue, or urine, the cytometer can be set to study the size and shape of cells and, using a special dye, their content of DNA (the genetic material, deoxyribonucleic acid) to help detect malignancy.

High DNA content may indicate a rapid division of cells or abnormal numbers of chromosomes, characteristic signs of cancer.

Using M.A.s to tag specific targets, the machine can also seek out various subdivisions of the same cell type, identifying them simultaneously with different fluorescent colors.

Although already helping in the care of patients, the procedure remains technically a research effort, financed by the National Institutes of Health. Patients receive the tests free.

Dr. Robert B. Colvin, Director of the Immunopathology Unit in the MGH Pathology Department, said the hospital has worked with flow cytometry for a half dozen years, but the major impetus for its use by his laboratory came in 1980 when M.A.s became available.

"We began a major research project to find better ways of detecting and coping with impending kidney transplant rejections," he said.

Working together, Dr. Paul S. Russell, Chief of the MGH Transplantation Unit; Dr. A. Benedict Cosimi, Chief of Transplantation Surgery, and Dr. Colvin have employed M.A.s to zero in on white blood cells called "T-lymphocytes" which emanate from the thymus gland. They play a leading role in the response of the body's immune system to foreign tissue.

With the highly specific antibodies, the cytometer can pick out particular types of

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Photographs: Page 1, Scott Davis; pp. 3, 4, 5, Myron Daniels; pp. 7, 8, courtesy of Dr. Paul S. Russell

Drawing: Page 6, reproduced with permission from *Surgical Management of Cerebrovascular Disease,* by Dr. Robert G. Ojemann and Dr. Robert M. Crowell

lymphocytes in blood and use a cell-sorting capability to gather samples for studies to learn exactly how they are active in the immune system.

"The work is like trying to recognize a distinctive face," Dr. Colvin explained. "In the past, we were able to identify one feature, like a nose. Now we can add the ears or the chin."

By monitoring T-lymphocytes in kidney transplant patients, the doctors have noted changes that permit a grouping of people into high-risk and low-risk categories of rejection. Just when a rejection might occur is not yet predictable.

Monitoring cell activity helps to customize the use of drugs to protect the new organ. Too much suppression of the patient's immune system increases the risk of infection.

In the hospital's Infectious Disease Unit, Drs. Martin S. Hirsch, Chief of the Virology Laboratory, and Robert Schooley use flow cytometry in a major research effort to learn more about the immune disorder AIDS.

They are monitoring at three-month intervals the status of beneficial T-lymphocyte cells in 120 homosexual men to discover possible changes that might indicate the first signs of AIDS.

Since 1981, the federal Centers for Disease Control in Atlanta has documented more than 6,500 patients with acute AIDS.

Involved in another study of the promising method, Dr. George R. Prout, Jr., Chief of Urology at the MGH, believes flow cytometry will revolutionize clinical pathology with respect to bladder tumors by revealing their presence before they can spread.

The second most common tumor among Americans, next to skin cancer, bladder growths have a tendency to recur and to become invasive among as many as 20 percent of patients. This can mean death if the condition is not quickly detected and treated.

The flow cytometer assesses DNA content in cells obtained from urine or a saline wash of the bladder. Although a biopsy (laboratory study of a tissue specimen) would presently be needed to confirm a tumor finding by the machine, the initial positive result would warrant the immediate start of treatment.

Dr. Prout said the flow cytometer can detect tumor cells when only a few are present and that 95 to 98 percent of the instrument's test results are confirmed by pathology findings.

Once a patient's cancer goes into remission (no trace of disease), the patient could be monitored relatively inexpensively by the cytometer at regular intervals to be sure that the cancer has not returned.

During a two-and-a-half year period, researchers in orthopedics have conducted flow cytometric analyses of DNA concentrations in cells from 217 bone tumors. In each case, the investigators sought to learn: Is the tumor harmless (benign) or cancerous (malignant)? If malignant, is the stage localized (low grade) or widespread (high grade)? And if the tumor is a sarcoma (a cancer arising from connective tissue), what is the likelihood of local recurrence or spread after surgery?

Results of the tests were compared with the standard definition of tissue malignancy.

"We got a relatively high rate of corroboration in assessing the potential malignancy of particular tumors," said Dr. Henry J. Mankin, Chief of Orthopaedics, "but, perhaps more important, we found indicators that certain tumors with very high DNA appear more likely to spread to other parts of the body."

Flow cytometric data on a tumor could become available only an hour after a surgeon extracts a tiny tissue specimen from a patient for study. The final tissue diagnosis from a pathology laboratory normally requires 24 to 48 hours.

"The cytometer could provide valuable support to the pathologist as he forms a diagnosis, perhaps even alerting him to look again at the tissue," Dr. Mankin pointed out. "The device adds nothing to the lab time and very little to the cost."

The MGH Orthopaedic Service now tests all of its bone tumor patients with flow cytometry. "Once we get a better definition for benign, low-grade malignancy, and high-grade malignancy and a better idea of how well the cytometer can predict a tumor's spread or local recurrence," the doctor said, "the test could become a part of a physician's normal armamentarium." ■

Dr. Frederic Preffer operating a flow cytometer in the MGH Immunopathology Laboratory

Leading The Way. . .

In the opinion of 250 prominent health professionals at major medical centers across the country, the MGH is the nation's finest general hospital.

The results of a poll by *Good Housekeeping Magazine,* published last month, also honored three specialty institutions closely associated with the MGH.

Shriners Burns Institute, staffed by MGH physicians, was named best burn center.

McLean Hospital in Belmont, owned by the Massachusetts General Hospital Corporation, was listed as second best psychiatric hospital.

Massachusetts Eye and Ear Infirmary, which abuts and shares space and consultants with the MGH, was ranked third among eye hospitals.

All four institutions are affiliated with Harvard Medical School. *Good Housekeeping* noted that "teaching hospitals frequently serve as referral centers for the most difficult cases and often attract the best staff."

The MGH Neonatal Intensive Care Unit

Mourning Couples Comfort Each Other

(Continued from Page 1)

the nurses.

"There's a special bond between the nurses and the parents," explained Ms. Reilly-Smorawski. "Very often the nurse may have been the only other person besides the mother or father to have ever seen or touched their baby on a daily basis. The parents also shared a highly emotional experience with us at a very vulnerable time in their lives."

Shortly after a baby's death in the NICU, the nurses send the parents a sympathy card, and at a later time a letter inviting them to talk about their feelings in a support group atmosphere with other parents experiencing similar emotions. At no time does anyone pressure the parents to attend the sessions.

"We simply tell them that we also feel their loss, and that we're here if they need us," stated Ms. Reilly-Smorawski, who has been a nurse at the MGH for 13 years. "Some of them feel they don't want more than periodic phone contact, but many others have found that joining our group can benefit them.

"Very often parents need the opportunity to express their feelings. This is true especially if they have no real support within their own family. We have also found that as time passes, parents continue to have medical questions about their babies that we can help answer by referring them to the appropriate sources. To us it shows that they have very positive feelings about the hospital and the care their baby received."

Ms. Reilly-Smorawski, along with Anne Armstrong, another NICU nurse, meets with the parents on Wednesday evenings, from 7:00 to 8:30, in the hospital's Walcott Room. "The room has a certain warmth to it," remarked Ms. Reilly-Smorawski. "We feel it's conducive to the supportive atmosphere of the group. And we also wanted a location far enough away from the Vincent-Burnham Building so that parents would not have to relive their child's death in the place it occurred."

The group begins by conducting a "life review" of the child, from the mother's pregnancy, through delivery, and finally to the baby's experience in the NICU. If available, certain items like the baby's hospital bracelet, a photograph, and a lock of hair are also given to the parents.

Through the NICU Bereavement Group, mourning parents find they can once again function effectively and enjoy life.

Later sessions examine such topics as guilt, how soon to have another child, if at all, and viewing the new baby as unique and not merely a replacement for the lost child.

"The first few weeks many parents are hesitant," Ms. Armstrong said. "But in time they allow themselves to open up, to show their vulnerability. They realize they can share their experiences in a safe place with other parents going through the same thing."

Although their children's lives may have been very short, the anguish many parents feel can be very long.

"Some people think that because it was a baby, the grief is somehow less severe," remarked Rosalie Tyrrell, a psychiatric nurse clinician, who also helped organize the group and who serves as advisor to the nurses. "Each child evokes a special memory for the parent, even if that child lived for only one day. It's not a therapy group; yet a lot of therapeutic work is done."

Ms. Tyrrell, who has formed a Bereavement Team at the MGH, believes the NICU group is particularly beneficial to parents. "A short-term group such as this really represents a microcosm of the loss experience and the beginning of grief work," she explained.

"The very thing the parents work on from the moment they walk in is the task of letting go. And a big part of this process involves talking about how they feel. It's interesting that very often a husband or wife will say things to a group that they'll be afraid to say to each other."

The psychiatric nurse clinician added that this is especially true of men. "It's difficult for a lot of men to express their grief," she said. "Women will often be able to communicate their feelings to other women, but men frequently can't or won't do that with other men. So for them, this is the one legitimate place to come to talk about their baby and their feelings of loss."

Parents are not the only ones to suffer a loss when a baby dies. "The nurses feel it as well," said Ms. Armstrong. "But we also experience a sense of loss when a baby goes home, especially one who's been a long-term patient. Fortunately, most of the children we care for are able to leave and live normal, healthy lives."

The nurses, who described the NICU Bereavement Group as an important extension of primary nursing at the MGH, said that once the parents complete the 12 weeks, they return to the MGH as a group at three-month intervals. "We just like to see how they're doing and to make ourselves available if they need us, especially in getting through the first anniversary of the child's death," said Ms. Reilly-Smorawski.

"Death is something that is not dealt with quickly or easily," declared Dr. I. David Todres, Director of the Neonatal

A Ballooning Artery Often Gives Warning Of a Potential Burst

(First of two articles)

One of the most common causes of sudden death—striking even the healthiest appearing individual—is a burst aneurysm in the brain.

Each year more than 25,000 Americans are stricken by the ballooning and rupturing of a weak spot in the wall of a major intracranial artery.

Half of those afflicted die or are left permanently disabled as a result of the initial bleeding from these aneurysms. If untreated, another 25 to 30 percent who manage to recover from the first hemorrhage eventually die after a second one.

The devastating toll attributable to these defects in the wall of an artery becomes all the more tragic when one realizes that in a great many instances the ruptures need not have occurred.

"Almost 40 percent of major aneurysmal ruptures are preceded by warning symptoms," said Dr. Roberto C. Heros, Director of Cerebrovascular Surgery at the MGH.

"One group of symptoms, such as localized head pain, cranial nerve palsies, and visual defects, can be attributed to expansion of the aneurysms. A second group of symptoms is thought to be caused by 'minor leaks' and consists of generalized headaches lasting several hours or days and often accompanied by nausea, neck or back pain, malaise, and occasionally photophobia [an abnormal visual intolerance of light]."

Patients describe the headaches as "explosive," "crushing," and "the most severe I've ever experienced."

An aneurysm can affect any artery in the body but becomes symptomatic most often in the head since the cranium, being a closed cavity, allows little room for an expansion of pressure.

The undersurface of the brain, in particular the so-called subarachnoid space, provides the most frequent setting for an intracranial aneurysm. In this space beneath the arachnoid membrane—one of three membranes or meninges covering the brain—arteries run free. In contrast,

(Concluded on Page 6)

Intensive Care Unit. "The loss of a child is one of if not the most traumatic experience any family can go through. There is so little that one can really say to the mother or father of a baby who has just died. Sometimes the important thing is to simply listen and to show that you care."

Dr. Todres, who is also an Associate Professor of Anesthesia (Pediatrics) at Harvard Medical School, said the NICU Bereavement Group demonstrates that the staff is concerned about the entire family, not just the patient, even after the patient is gone.

"With so much focus on technology, very often the human side of medicine may seem to be ignored," he said. "So it's important to emphasize the caring aspect . . . that our doors are always open to provide intensive care to families."

Instrumental in developing the NICU Bereavement Group were Anne Sheetz, Chairman of Pediatric Nursing at the MGH; Barbara Pikl, a clinical nurse leader; and Pauline Comfrey, head nurse in the NICU. All have given assistance and support to the program and its participants.

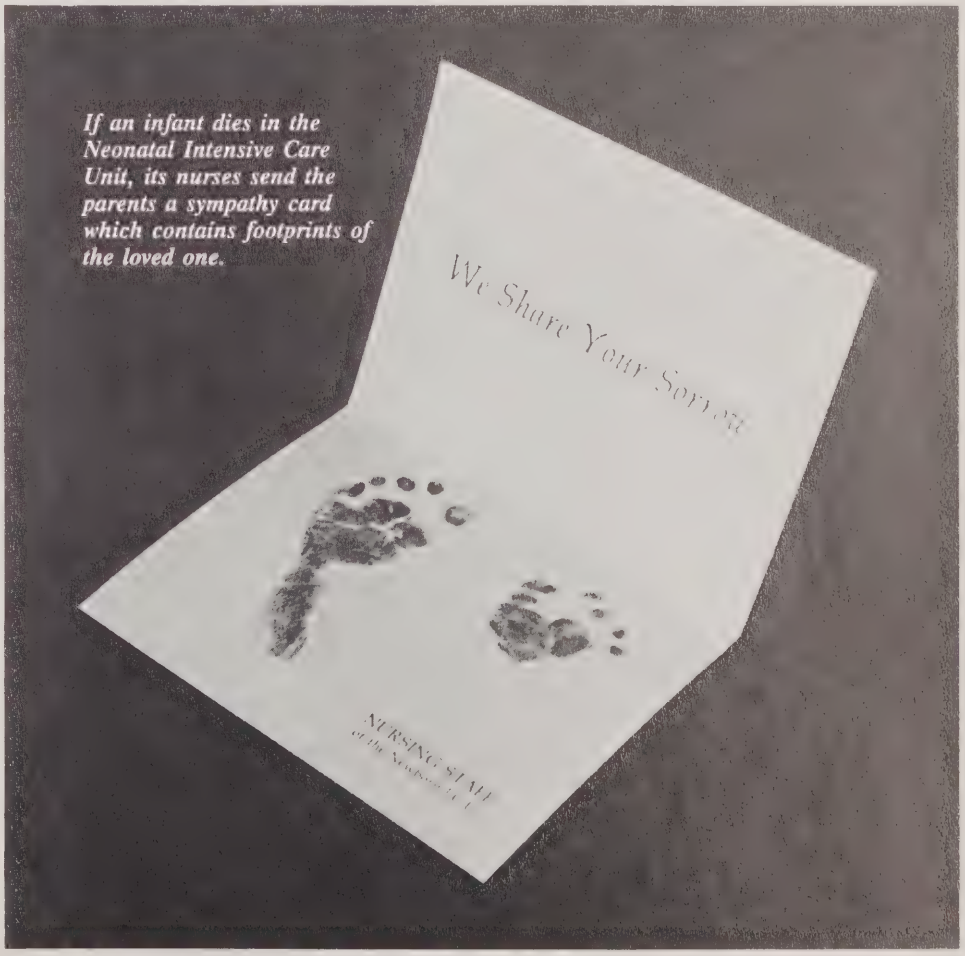
Approximately 20 couples have already participated in the bereavement groups, and according to Ms. Armstrong the progress made has been most gratifying. "You can really see how the parents have changed from the first week of the program to the last week," she declared. "The parents have an increased ability to function more effectively, and they tell us how they have begun to find pleasure again in previously enjoyed activities. They also report having better sleeping patterns, an increase in appetite, and more energy."

Ms. Armstrong added that these changes can even be seen in the clothing parents wear to group sessions. She explained that at the beginning, they will often choose drab colors, but at the end many will wear brighter clothing. "Hopefully their outlook is a little brighter as well," said the nurse. "Just seeing this evolution taking place, to me, makes it all worthwhile."

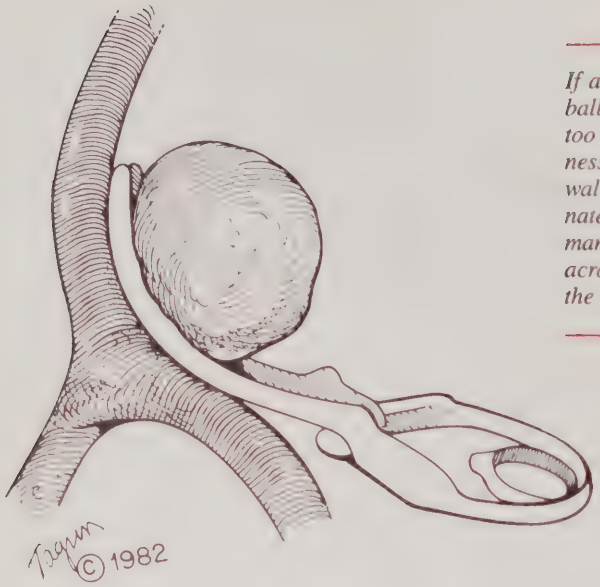
Written comments from parents show the impact. One wrote, "During the earliest days of my grief, the fact that I was going on Wednesday literally kept me going from one week to the next. It was one of the few comforting places to be.

"In a large sense, seeing each other's progress from week to week was—and is—a beautiful experience. That is hope."

Wrote another mother: "Keep it up. When you can't save the child, save the parents." ■



If an infant dies in the Neonatal Intensive Care Unit, its nurses send the parents a sympathy card which contains footprints of the loved one.



If an artery's ballooned sac is not too large, the weakness on the vessel wall can be eliminated by a clip permanently placed across the neck of the aneurysm.

Advanced Techniques Reduce Artery Risk

(Concluded from Page 5)

vessels deep within the brain are surrounded and supported by tissue, making formation of an aneurysm there less likely.

A dozen years ago surgery to eliminate an intracranial aneurysm prior to rupture carried a 15 to 20 percent risk of death or a major handicap brought on by a stroke. Today the combined death-sickness (mortality-morbidity) rate from operating on such an unruptured aneurysm stands at less than one percent in expert hands.

Advances in diagnosis, such as development of the CT (computerized tomography) scan, have made possible the detection of most aneurysms of significant size (more than a quarter of an inch) without probing into the brain.

If the aneurysm has not grown too large and has not hemorrhaged, a neurosurgeon can simply clip the neck of the ballooned tissue, thereby eliminating the weakness in the blood vessel wall.

"The risk of death or disability has been reduced even among patients who have experienced ruptures," Dr. Heros said. "If such a patient is in good condition preoperatively and the aneurysm is not a giant one [one inch or more in size], the combined mortality-morbidity rate can be as low as 2 or 3 percent."

Since giant aneurysms generally cannot be clipped, surgeons must follow a much more complicated and difficult treatment procedure. "It is the type of problem that certainly has to be handled in a major medical center," Dr. Heros said.

Details on treating giant aneurysms will be reported next month in the *MGH News*.

Dr. Heros said the dilation of blood vessels generally results from a combination of factors: a congenital weakness in an artery and some stressful event which raises blood pressure. Aneurysms occur slightly more often among women than men and appear most commonly in people between 30 and 60 years of age.

The only effective treatment for an aneurysm is surgery. Dr. Heros, who is also Associate Professor of Surgery at Harvard Medical School, said measures to avoid stress and lower blood pressure have been suggested in the past in lieu of an operation but have not helped.

The CT scan provides the initial diagnosis of an aneurysm's presence. Two MGH neurologists, Drs. C. Miller Fisher and J. Philip Kistler, have developed a way of studying the scan to evaluate the seriousness of a rupture.

By correlating the extent and location of blood on the scan, they can predict the area and severity of a blood vessel spasm (vasospasm) which often follows a subarachnoid hemorrhage and leads to stroke. Vasospasm usually is triggered by irritation of the vessel by leaking blood.

Knowledge of which patient is in jeopardy of developing stroke associated with severe vasospasm is used in deciding medical therapy and the timing of surgery.

At present, vasospasm is the leading cause of death or disability in patients who initially recover from a subarachnoid hemorrhage. The new deterioration generally begins between the fourth and the twelfth days after the first bleeding episode.

Dr. Nicholas T. Zervas, MGH Chief of Neurosurgery, has conducted pioneering studies into specific causes of vasospasm and has demonstrated the value of certain drugs, such as reserpine and kanamycin, in blocking the production of substances which leads to this disorder.

MGH doctors also are studying the effectiveness of nitroglycerin in preventing symptomatic vasospasm. By utilizing the CT scan to predict which patients are in jeopardy, they can study the effects of early preventive treatment.

When a patient's condition permits, doctors X-ray the aneurysm and surrounding area after an injection of contrast material to make the blood vessels visible on the film. This provides the surgeons with a detailed map with which to plan their repair work.

At one time clipping the neck of an aneurysm inadvertently injured tiny vessels around this sac. Surgeons can now spare these vessels because microscopes can magnify the view of the operating field by 15 times or more.

"This and other advances, such as safer anesthetic techniques and, particularly, better ways of selecting patients for surgery, have significantly improved the results of intracranial operations for aneurysms when performed by experienced hands," said Dr. Heros.

"Aneurysms that previously were unmanageable, such as most giant aneurysms, can now be approached with acceptable morbidity."

Dr. Heros added that greater experience with such physiological techniques as blood flow measurements, positron emission tomography, and magnetic resonance imaging may further improve the ability of surgeons to choose the optimal time for operating.

"Finally, and most important," he said, "greater public awareness of the significance of 'warning signs' of a ruptured aneurysm together with continuing advances in currently available noninvasive techniques such as the CT scan should allow us to detect an increasing number of these abnormalities before they result in a catastrophic hemorrhage.

"We're confronted too often with a need to patch up the problem after significant damage has already occurred." ■

Resource Sharing Benefits Liver Transplant Effort

Chicago . . . Detroit . . . Kansas City . . . Indianapolis . . . Grand Rapids . . . Atlanta . . . Louisville . . . Fort Lauderdale . . . Dayton. . . .

The list goes on.

Since the beginning of the year, an MGH surgeon, Dr. Francis L. Delmonico, and a colleague have flown by chartered jet with priority clearance to a score of cities to remove a donor liver from a deceased person and bring the organ to Boston for transplantation.

Dr. Francis Delmonico arrives at an MGH operating room with a donor liver brought from another city.

The liver was destined, not necessarily for the MGH, but for any one of four Boston hospitals which since January have comprised a consortium called the Boston Center for Liver Transplantation (B.C.L.T.).

In virtually every instance of organ procurement, the other surgeon on the removal team represented New England Deaconess Hospital, New England Medical Center, or Children's Hospital, even when the organ was to benefit an MGH patient.

Often, the interhospital activity has extended to implantation of the donor liver as well.

The largest organ in the human body, next to skin, the liver has literally thousands of functions, including protein, carbohydrate, and fat metabolism; the disposal of toxins circulating in the blood, and the storage of certain nutrients, such as sugars, vitamins, and minerals.

Since it plays such a crucial role, the liver has a capacity for regeneration unequaled by any other organ. But this ability is not always sufficient to override disease.

"There are few liver diseases that can be treated medically," added Dr. Jules L. Dienstag, a liver specialist in the MGH Gastrointestinal and Transplantation Units. "We can sometimes treat the symptoms and the complications of a liver problem, but it is usually very difficult to treat the primary disease.

"Until transplantations were performed, we often found ourselves shepherding patients through a steady downhill course. Now at last we have something to offer."

Transplanting an organ as complex as the liver requires so much work that the procedure may take 12 hours or longer. Dr. A. Benedict Cosimi, MGH Chief of Transplantation Surgery, said that by contrast a heart transplantation typically takes from four to six hours and one involving the kidney from three to four.

Dr. Cosimi said that removal of a patient's liver often becomes a lengthy and difficult task because of a proliferation of blood vessels around the organ due to disease. This necessitates special measures to control bleeding.

In addition, during installation of the transplant many connections must be made to the patient's circulation, and a duct must be hooked up to carry bile from the new liver to the small intestine to serve as a digestive aid.

The energy drain inflicted upon the surgical team by the difficult procedures thus is considerable. This is one reason why the consortium came into being.

"We were convinced from the outset that with the number of transplant candidates we anticipated, a single institution doing the work would be severely taxed," said Dr. Paul S. Russell, Chief of the MGH Transplantation Unit. "With several hospitals banding together, however, we felt we would be able to handle the load."

Dr. Russell was correct in his assessment. During a five-day period from October 19 to 23, four critically ill patients from as many states received liver transplants in Boston.

Surgeons performed two operations at New England Deaconess, one at New England Medical, and one at MGH. Two transplantations—at the MGH and the Deaconess—took place during overlapping hours.

The MGH patient, a New Hampshire schoolteacher who 11 years ago had been cured of a different and unrelated form of cancer, had suffered from primary cancer of the liver. Surgeons implanted his new liver, donated in Illinois, only after they determined that his disease had not spread to other parts of his body.

Had such signs been found, the organ would have been given to the Deaconess where a Florida minister's wife was awaiting a transplantation. Her procedure finally began after a donor liver arrived from Gainesville, Fla.

(Continued on Page 8)

Dr. Delmonico (left) and Dr. A. Benedict Cosimi prepare the donor liver for transplanting.

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Regaining Good Health With a New Liver

(Continued from Page 7)

The New England Organ Bank, established 17 years ago to procure kidneys for transplantation, also locates needed livers. The organ bank is linked with centers serving much of the United States and parts of Canada.

When Dr. Delmonico flies to another city to obtain a donated liver, he makes three telephone calls to the hospital planning the transplantation. At the MGH, the calls go to Dr. Cosimi.

In the first call, if all is going well, Dr. Delmonico advises that he is satisfied with the deceased as a potential donor. The recipient is then moved to an Intensive Care Unit. An hour later, a second call informs that examination of the prospective donor liver shows that it meets all criteria and that the donor operation is under way. The word goes out to move the recipient to surgery and begin. Later, en route to the airport, the third call: "We're on our way back. Our anticipated arrival time is. . . ."

Doctors estimate that a person who receives a liver transplant has a 65 to 70 percent chance to survive at least a year.

"The odds really depend heavily upon the mix of patients one is called upon to treat," said Dr. Russell, who is also John Homans Professor of Surgery at Harvard Medical School.

"If you have a large number of children with biliary atresia [a condition damaging to the liver's bile ducts], the success rate for your transplants should be relatively high whereas if you have more patients with cancer in the liver, the success rate may be somewhat lower."

Often liver transplant patients rescued from certain death recapture their health with amazing speed.

Dr. Russell recalled a teen-ager from Syracuse, N.Y., who came to the MGH suffering from a genetically determined condition called Wilson's disease in which copper deposits destroy the liver.

"Kim Wood developed a form of cirrhosis [scarring] and then liver failure," said Dr. Russell. "She was very near death when we obtained a new liver for her."

Kim Wood at her high school graduation after receiving a lifesaving liver transplant

The 17-year-old high school senior did so well after receiving her new organ last January that she soon returned home and to her classes. In June, she stepped onto a stage to accept her high school diploma. Today, as healthy as any of her peers, she is pursuing studies at a community college in Syracuse.

Before a consortium hospital accepts Kim or any patient for a transplantation, it faces strict eligibility requirements. "Some patients with liver failure are so debilitated they would not survive the very lengthy and complicated procedure," Dr. Dienstag said. He added, "People who have reached their late 50s usually are not strong enough."

Others fail to qualify because of diseases outside the liver, such as kidney failure or a heart condition.

Many people suffer liver failure because of a history of alcoholism. "We don't absolutely exclude alcoholics," Dr. Dienstag said, "but we require that they demonstrate at least a year's abstinence from drinking before we consider them for an operation like this."

The recipient must be responsible for taking daily medications postoperatively. Interruption in the treatment regimen will almost surely lead to rejection of the liver. Earlier experience with unreformed alcoholics at other centers resulted in negligible survival because the patients discontinued their medications during periods of alcohol abuse postoperatively.

The patient must be able to withstand antirejection drugs that unfortunately compromise the body's defenses against foreign matter. And rehabilitation is customarily a long-term affair. In all, a patient may require six to eight weeks of hospitalization.

The care in selecting surgical candidates is matched by the scrutiny of every detail of a patient's postoperative course.

In addition, physicians at all of the Boston hospitals treating liver transplant patients meet to discuss the past month's work. In that way, everyone learns more about developments in transplantation.

Standardized forms soon will become available to each B.C.L.T. hospital for collecting data on each patient. A central computer will store the information.

Dr. Russell said, "There's no question but that the consortium has benefited not only patients who received liver transplants but medicine and surgery in Boston as well.

"It has improved collaboration and the sense of community spirit which we have. We feel that we are working together rather than at any kind of cross-purposes."

When the four hospitals first conceived the consortium, critics thought the cost of the transplant surgery would be forced up. Estimates as high as $230,000 were heard. In a report on its first six months of activity, the B.C.L.T. said the average charge for transplantations on 10 patients came to $99,779.

One important objective will be to bring costs down even further. ■

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 1 January–February, 1985

Does Infant Babbling Offer Signs of Later Qualities of Speech?

Babies can discriminate sounds as soon as an hour after birth and by 18 hours are aware of the sound of their own voice.

When an infant is destined to suffer a speech disorder, however, the problem may not surface until 10 to 18 months later when language acquisition normally begins.

Children born with certain neurological illnesses or physical abnormalities constitute exceptions, of course, since a speech difficulty may be a known link to the particular affliction.

With other babies, is it really necessary to wait so long to learn of some language obstacle? Would earlier detection facilitate corrective measures? These are among questions now being asked by John L. Locke, Ph.D., Director of the MGH's new Neurolinguistics Laboratory.

During the first few months of life, babies cry, laugh, shriek, or coo to express emotion. At about seven months, they begin to utter chains of seemingly meaningless syllables like da-da-da-da or pa-pa-pa-pa. Babbling, it is called.

Dr. Locke regards babbling as a biologically motivated behavior, little influenced by environmental conditions.

"If one studied children reared in

(Continued on Page 2)

Dr. John Locke records for analysis the vocal sounds of 8-month-old Sarah Michel, held by her mother, Mrs. Anthony Michel.

Parasitic Research Given New Impetus

Famine Causes Major Spread of Infections

Hardly a day goes by when the news media fail to report on the western world's massive effort to save Africa's starving millions.

Since the early 1970s, drought has cut wide swaths through the continent, killing an estimated 300,000 people.

Of some 7.7 million in distress in Ethiopia alone, one million are under the age of 4. United Nations officials expect half of these children to endure significant, lifelong physical and mental impairment because of what they are going through now.

The aid effort is not, however, confined to food shipments. In medical centers across America, including the MGH, scientists are striving to conquer parasitic diseases which thrive in tropical, famine-plagued and otherwise impoverished regions of the world.

For many who died in Africa, starva-

(Continued on Page 3)

Tiny Balloons Close Weak Blood Vessels

(*Second of two articles*)

With the help of MGH specialists, a college student from Greece has overcome a brain abnormality which threatened his sight and ultimately his life.

The 20-year-old patient—we will call him Constantine—flew 4,700 miles to Boston after doctors at a neurological institute in Moscow advised there was nothing they could do for him.

Not only did the young man find a solution at the MGH but also much of the work was performed with greater safety, more comfort, and less cost than was possible with other, more conventional methods.

Constantine's plight began when a weakness on the wall of his internal carotid artery ballooned to more than an inch in size. The giant aneurysm, or sac, pressed against a nerve controlling his eye muscles.

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EDITORIAL:

Serving the Third World

A young MGH physician takes a year out from his training to treat some of the deprived children of Indonesia. Michael St. Louis left the impoverished sick of that large nation healthier than he found them. And he returns to this hospital a better physician and a better person for his experience.

What Dr. St. Louis accomplished has become a tradition at the MGH: physicians young and old serving the downtrodden of other countries. They usually do this for little more than their expense money. Some journey at their own expense. They care for their Third-World patients without charge.

Uganda, Kenya, Mali, Zaire, Rwanda, Nigeria, Ivory Coast, Senegal, Labrador, India, Thailand, Nepal, Bangladesh, Viet Nam, Cambodia. These are just some of the nations where the doctors have served. They have trudged through swamps, climbed mountain roads, teetered over rope bridges, and endured monsoons, tropical rain forests, and frigid temperatures to reach the sick.

Most return without fanfare and settle back into the more mundane world of Boston and the MGH. But like Michael St. Louis, they are never quite the same. Their devotion to the cause of the downtrodden remains an inspiration to their MGH colleagues, many of whom quietly set similar standards without ever leaving the MGH.

The contributions made by this hospital to world health through research advances and the training of physicians are well known. The front page research story about parasitology serves as a more direct kind of investigational help to the Third World. Involved is an attempt to find ways to alter or block the action of parasites, a pest that plagues poorer nations.

As the article points out, parasitic diseases thrive in famines like those that are now ravaging Africa. But the volunteer effort in little-known parts of the world offers a very different perspective from research. For besides patient care, these MGH physicians pass on to their colleagues (often by establishing training programs in these poor nations) that part of medical knowledge most applicable to these countries. Therein lies the most important contribution, the legacy of medical training. One has to think that the two doctors who founded the MGH in 1811 would be pleased.

Babbling of Infants Parallels the Start Of Other Behavior

(Continued from Page 1)

Russia, Germany, France, or England, and exposed to the language of the respective country, no evidence would be found," he said, "that any sound patterns produced by the babies reflected exposure to the language before they actually began to talk."

According to Dr. Locke, no one really knows why babies babble. Even infants born deaf may babble, and since they cannot hear themselves, it is reasonable to ask, "Why do they continue this activity?" Dr. Locke offers a theory. The sounds emerge at precisely the same time as the baby develops rhythmic movements like rocking and a preference for using one hand over the other. Perhaps babbling, he said, relates more to these neuromuscular developments than it does to sound making.

Dr. Locke, who is also a Professor in the MGH Institute of Health Professions and a Lecturer in Neurology at Harvard Medical School, feels that much of the developmental value of babbling lies in parents' responses to it.

"There is evidence," he said, "that babbling precipitates caretaker responses that induce the baby to discover the existence of words.

"If an infant did not babble, people would have no idea of what the child was capable, of what sounds were the most pleasing to him, and they would really have no way of approaching the baby linguistically."

When the baby goes da-da-da-da, however, parents may feel that the child is about to learn to talk. By the parents responding da-da-da-da-daddy-daddy, the baby is, in effect, being primed to acquire language.

Babbling almost always involves syllables beginning with a consonant and followed by a vowel. The most common of the true consonants are "d" and "p." Interestingly, this may be related to babies' tendency to say "daddy" (or "papa") before "mommy." When the baby spontaneously says meaningless sounds such as "da-da," mothers are likely to interpret

Photographs: Pages 1, 4, 5 (upper), Myron Daniels; p. 3, courtesy of Dr. John L. Locke; pp. 5 (lower), 6, courtesy of Dr. Michael E. St. Louis; pp. 7, 8, courtesy of Dr. Gerard M. DeBrun.

Parasitology

(Continued from Page 1)

tion so weakened the body's defenses, or immune system, that parasites found easy prey for lethal infections.

Parasites, including worms, insects, and single-celled organisms called protozoa, feed and grow on or within a different living creature at the host's expense. Some parasites inhabit the body for years, diverting needed nutrients and sapping the host's energy (*MGH News,* April 1979). Three billion people (or two-thirds of the world's population), most of them living in underdeveloped nations, are affected.

Now, the John D. and Catherine T. MacArthur Foundation has announced sponsorship of a $20 million, five-year medical research campaign against parasitic diseases. The Foundation chose nine centers in the United States and one each in Australia, Israel, and Mexico to participate.

One of the assignments provides for collaborative work by the MGH and the Harvard University School of Public Health. Under the direction of Howard M. Goodman, Ph.D., MGH Chief of Molecular Biology, and Dr. John R. David, Professor of Tropical Public Health at Harvard, researchers are applying modern techniques of molecular biology to learn more about how parasites interact with mammalian and insect hosts.

From these studies, the investigators hope to devise ways of altering or block-

(Continued on Page 4)

these sounds as attempts to say "daddy" and to repeat them while pointing to the father.

The "m" sound, as in "mama," is usually less common in babbling, and this probably contributes to children's delayed reference to their mother.

This relationship between babbling and parent-naming holds for other languages besides English. In fact, in a study of more than 500 languages, it was found that in 78 percent the name for father contained orally released sounds such as the "d" and "p" of "daddy" and "papa." And an equal percentage of the names for mother contained a nasally released sound such as the "m" in "mama."

One linguist proposed that the reason for these coincidences was the fact that while breast-feeding, the only sounds the infant can make are nasal. As a consequence, the linguist said, mothers began to associate m-like sounds with themselves, and incorporated these sound patterns into the vocabulary as "mama," "mommy," "nana," and so on.

Virtually all languages contain a separate set of words used by adults almost exclusively with babies. A study of some 30 languages indicates that the most common baby words typically refer to parents, body parts, bodily functions, or some social interaction. In English, for example, the dictionary defines tummy and bye-bye as baby-talk for stomach and good-bye. They function like training words, designed to draw infants into language.

The Comanche Indians had more than 60 words that they used solely with children. Each word was tailored to the sound-making abilities of the babies. Comanche parents began to use these words when they thought that their child was about to begin speaking, usually at about 1 year of age, and quit when the child was well into language, at about 3 or 4 years.

Many speech pathologists and neuropsychologists, such as Dr. Locke, believe that babbling may hold a clue to later speech dysfunction.

"Although a language disorder is not generally picked up until a child begins to talk, or later, we assume that there may be something different about the child earlier," Dr. Locke said. "This difference might even have preceded birth.

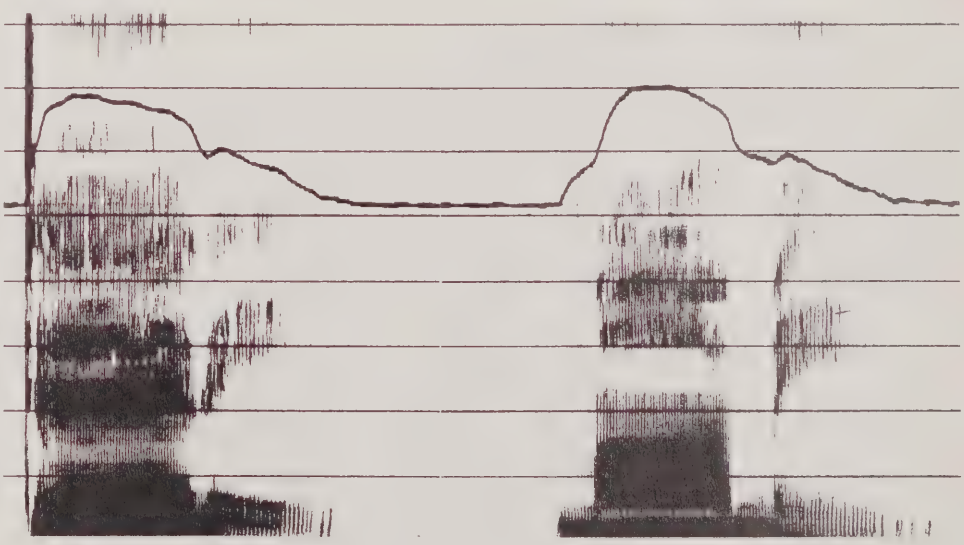
"In any event, when a difference exists, we feel it must be revealed in some manner. An obvious method of looking for this is to study how the baby produces sounds and responds to the sounds of other people."

Scientists have speculated about babbling for many years, but only in recent years have they been able to use electronic techniques such as computer-assisted sound analyses to more thoroughly probe this phase of child development.

The Neurolinguistics Laboratory, which opened at the MGH in the fall of 1984, strives to learn more about such questions and, more generally, about how the brain performs all the functions needed for speech and language. These include perceiving sounds, storing and retrieving words, and producing sentences. These behaviors are sometimes easier to observe in the developing child.

"If a baby is born with some hearing loss, we can take immediate steps to make sure that the child has amplification to hear speech better," Dr. Locke said. "Similarly, if there is something awry about a baby's early vocal development, we want to know about that before a language problem occurs. We want to work with that child right away, not wait until he is 2 or 3 years old."

Dr. Locke said he is optimistic that relationships exist between infant vocal development and the later acquisition of language, and that these links will be revealed by the kinds of analyses which may be carried out in his laboratory. ■



Daddy **Mommy**

The bars in each vertical spectrographic display above represent the sounds in "daddy" (left) and "mommy" (right). The wavy horizontal line at the top indicates the intensity of the sound patterns.

MGH Focuses on Two Parasitic Diseases

(Continued from Page 3)

ing the action of the parasites.

The MGH projects center on two devastating diseases. In the Department of Molecular Biology, Dr. Goodman and Dr. Jay A. Fishman are studying *Pneumocystis carinii* pneumonia (PCP), which plagues the severely immune deficient.

PCP was described in the 1920s among malnourished children in orphanages in Iran and later in epidemics among malnourished infants in Europe during and after World War II. PCP was not successfully treated until the 1960s. Today it is turning up in a new, even more challenging form among the immunosuppressed, most notably in patients with AIDS (Acquired Immune Deficiency Syndrome). More than 55 percent of AIDS patients have PCP.

At the same time, many newborns and children starving worldwide will die of Pneumocystis pneumonia and other parasitic infections.

Dr. Fishman, a Research Fellow in Molecular Biology and a Clinical and Research Fellow in Infectious Diseases, said the Pneumocystis organism survives in the body by attaching to cells lining the lung. Research suggests that most people are exposed to Pneumocystis by the age of 15, but those with normal immunity escape significant illness because they develop natural protection against the parasite.

"We are now seeing a number of patients with Pneumocystis infection whose condition resists traditional modes of treatment," Dr. Fishman said. "As a result of newly developed culture systems in the laboratory, we can test other drugs in culture to see if they can combat the infection.

"Through the techniques of molecular biology we are also looking for clues as to just how the parasite resists the antibiotic agents."

In the hospital's Infectious Disease Unit, Dr. John S. Wolfson is project leader for an investigation of Chagas' disease (caused by an organism called *Trypanosoma cruzi*), estimated to affect up to 10 million people in Central and South America, particularly in Brazil.

Drs. Morton N. Swartz, Chief of the MGH Infectious Disease Unit, and David C. Hooper are collaborating with Dr. Wolfson and Gail A. McHugh, a senior technician.

Chagas' disease is the most common cause of death among Brazilian adults ranging in age from 20 to 55 years. The unicellular organism invades through the bite of an infected bug.

Describing the disease as really one of poverty, Dr. Wolfson said the insects carrying the parasite live in the thatched walls and ceilings of homes and strike at night as people lie asleep on the floor.

Effects of the illness on children may include disorders of the heart or central nervous system. As many as 10 percent of children with such involvement die. More commonly, people infected during childhood suffer no symptoms until 10 or 20 years later when congestive heart failure or irregularities (arrhythmias) of the heartbeat set in. Either condition can cause death.

"At present, there is little one can do to treat the disease directly," Dr. Wolfson said. "One drug can be prescribed, but it really doesn't work for every patient and has undesirable side effects.

"We are growing the *Trypanosoma cruzi* organism in our laboratory to learn how an essential part of the parasite called the kinetoplast duplicates itself.

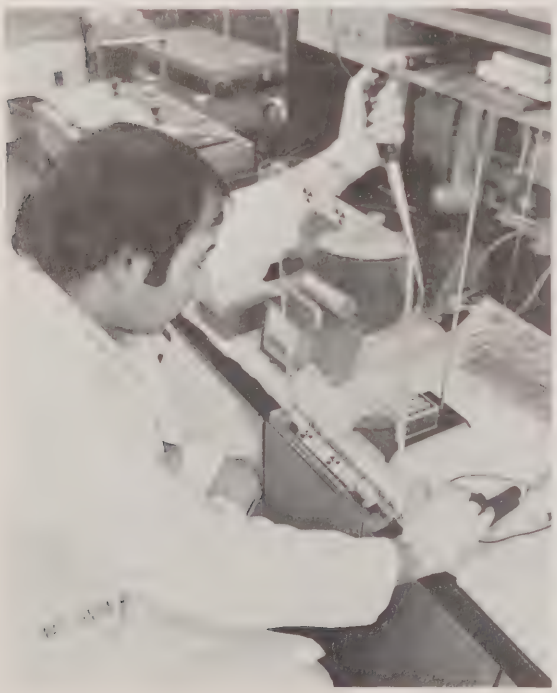
"The kinetoplast contains a large amount of DNA [deoxyribonucleic acid, the chemical making up genes], and we hope to find drugs which will interfere with replication of the kinetoplast, thereby killing the organism."

Molecular biology gives the parasitologist many new strengths to better understand and manipulate various organisms. In addition to the ability to grow some parasites in the laboratory, new animal models have been developed for probing parasitic infections.

Highly specific monoclonal antibodies can also be produced to determine the presence or absence of certain proteins in parasites, to isolate proteins which could identify a parasite, and to learn the stage of an organism's life cycle.

Through molecular biology, the scientist can identify genes that turn on or off naturally at certain times of a life cycle. By isolating specific proteins, investigators may be able to find certain ones which if given to a patient may stimulate an immune response to protect the individual from further infection.

Dr. Fishman said scientists envision a



Dr. Jay Fishman (left) prepares radioactive test to verify isolation of specific genes from cultured Pneumocystis. At right, Dr. Howard Goodman examines a film showing results of the test.

vaccine some day that will protect against not just one parasitic disease but up to 20 parasitic as well as nonparasitic infections. Much work lies ahead, he said, before realizing such an achievement.

As investigators evolve more sophisticated research procedures, the Parasitology Laboratory in the MGH Infectious Disease Unit works at high gear to diagnose parasites in stool, blood, and other specimens.

Operated by Technologist Specialists Mary Ann Waldron and Deborah M. McCarthy, and supervised by Dr. Wolfson, the laboratory processes from 250 to 350 samples each month. Organisms of one type or another turn up in about 30 percent of the specimens.

Last year, Mrs. Waldron initiated a new technique for staining stools to facilitate the search for an organism called cryptosporidium which plagues some AIDS patients. Dr. Wolfson said the disease is also being studied as a new cause of diarrhea in otherwise healthy people. It may turn out to be one of the more common causes of self-limited diarrhea in children, he said.

The laboratory receives a large number of different organisms from Southeast Asian refugees who have resettled in the Greater Boston area. Dr. Wolfson, who is also Assistant Professor of Medicine at Harvard Medical School, emphasized that parasitic diseases are common in Southeast Asia and, for the most part, are readily curable.

Stained with a fluorescent dye, a key portion of the organism called Trypanosoma cruzi *is viewed under a microscope using ultraviolet light by Dr. John Wolfson and Senior Technologist Gail McHugh of the Infectious Disease Unit.*

The doctor did caution, however, that Americans planning travel to other countries should make sure that they receive immunization against illnesses particular to those places.

Malaria, for example, once on the wane, is spreading worldwide. This spread is due to new strains of parasite resistant to customarily prescribed drugs, carrier mosquitoes resistant to insecticides such as DDT, and decreased measures to control the disease.

The federal Centers for Disease Control in Atlanta regularly files updated information on malaria and other diseases with Travelers' Clinics operated in the MGH Infectious Disease Unit and at the hospital's Medical Station at Boston's Logan Airport. Personnel at the clinics can explain to callers what health risks they face abroad and what protective measures should be taken. ■

Indonesians Benefit From the Services Of MGH Physician

As his plane settled for a landing in Indonesia, Dr. Michael St. Louis wondered how the country's young children could be plagued with health problems.

"From the air, the land looked green and lush in every direction," he said. "In contrast to severe drought in some developing nations, water to nourish the soil and to support crops is plentiful in Indonesia. The country seemed to be a land of abundance."

Yet almost 50 percent of its children die before the age of 5 years, compared with 2 or 3 percent in the United States.

Ten percent of Indonesia's babies fail to reach their first birthday, contrasted with about one-tenth of one percent in America.

A 1981 graduate of Harvard Medical School, Dr. St. Louis decided after two years of training in the MGH Children's Service to work a year in Southeast Asia developing badly needed primary health care programs.

Assisted by a fellowship from the Luce Foundation, he went to Indonesia under auspices of the Save The Children Federation. With 150 million people, Indonesia was both the poorest and largest of the countries to which the Luce fellowship could be applied.

Dr. Michael St. Louis crossing a fast-moving stream in northern Sumatra

The young physician found that a small number of diseases caused a large percentage of the child fatalities in the three thousand islands which make up the country once known as the Dutch East Indies.

Diarrhea, malnutrition, and respiratory disorders, including pneumonia, each account for 20 percent of the deaths. Immunizable diseases, such as tetanus, whooping cough, measles, and tuberculosis, cause another 15 percent. Tropical parasitic diseases and unusual infections contribute to the remaining losses and in many instances may have overlapped other diseases but had gone undetected.

Addressing more than 30 pediatricians and fellow pediatric residents at an MGH Children's Service meeting (Grand Rounds), Dr. St. Louis noted that during

(Continued on Page 6)

Few Doctors Serve Indonesia's Needs

(Continued from Page 5)

his stay in Indonesia last year he was one of only two pediatricians in a province of two and a half million people.

"In addition to the disease burden that people of developing countries face, there are sharp limitations of resources, of manpower, and of organizational and managerial abilities to address those difficulties," he said.

The doctor worked in northern Sumatra where rice paddies dominate the terrain. With very few mechanical implements to assist, an enormous amount of human labor must go into the planting and harvesting of crops.

The workers and their families establish homes along waterways which provide water for drinking and washing and fish for the table. Unfortunately, the same waterways are used for waste disposal.

Indonesians believe in western-style medicines, but many also buy herbal tonics. In fact, some estimate that the populace spends as much as five percent of personal disposable income on such tonics.

Faith healers attract large numbers of supporters. It is not unusual, Dr. St. Louis said, for a doctor to encounter a patient wearing an amulet given by a faith healer to ward off evil or injury.

The MGH physician said that the success of his health care development efforts hinges on the community leaders' support which facilitates the recruitment and training of volunteer counselors and workers.

Many Indonesians spend heavily on herbal tonics to treat illnesses or simply maintain good health.

"We were not engaged in relief work where one deals with a dislocated, perhaps demoralized, population, a people totally unable to care for their needs," he said.

"The communities in which we worked were intact. Although less developed in an economic and material sense, they have an old, complex, and refined culture and social system. The people already have certain ideas about disease and illness and about their prevention or amelioration.

"The goal was always to help advise and train Indonesians to take care of their own health needs."

Communication is a major task. Sometimes just trying to reach people presents a problem. In traveling to one project area Dr. St. Louis had to negotiate a shaky rope walkway to cross a fast-moving river.

Some of the conditions devastating the population ironically succumb to safe, inexpensive measures. Dehydration that results from acute diarrhea, for example, can often be treated with simple solutions of sugar and salt.

By continuing proper nourishment, the people can avoid dehydration. Village counselors are taught to advise nursing mothers that if their babies develop diarrhea, the breast-feeding should continue. A traditional practice of stopping feeding or of switching to clear liquids alone during a time of diarrhea can prove harmful.

Despite the serious malnutrition problem in Indonesia, Dr. St. Louis saw very few children who could be called grotesquely malnourished.

He projected for his colleagues the slide of a typical malnourished child. The baby boy had attained the height and weight of a 14-month-old, and the doctor said the child walked around doing things appropriate for that age. But the boy was not 14 months old; he was almost twice that age.

The child displayed a marked seasonal pattern in his loss-of-growth rate. In such instances, this often could be attributed to the fact that when families migrated from their primary residences to the rice fields for seasonal work, they left behind familiar sources of protein that should go into a child's diet.

Working with growth charts, Dr. St. Louis taught village health workers to seek out the nutritionally deprived who were just entering growth failure. The workers were trained to help mothers improve the health and nutrition of those children at high risk. At the same time, volunteers searched the countryside for children whose parents could not take them to the clinic.

"We didn't expect to produce children equal in size to those in the western world," said Dr. St. Louis, "but we did aim for some weight gain each month."

On occasion the advisers had to combat myths. For example, some parents believed that eggs caused worms and that therefore children who ate chicken eggs were sure to become ill. Through demon-

To improve child growth, village health workers prepared for families demonstration meals that were both attractive and highly nutritious.

Tiny latex balloons used to seal off injured arteries are shown deflated and iodine-inflated.

Use of Bypass and Balloon Saves Patient

(Continued from Page 1)

His left eyelid closed, preventing vision. Worse yet, while the growth of a giant aneurysm is gradual, it is also relentless. Without intervention, some types of giant aneurysms cause death or complete disability within about five years.

In general, if an aneurysm is small, a surgeon could simply clip its neck, thereby strengthening the artery wall and preserving the vessel's blood flow (*MGH News,* November 1984). For Constantine, such strategy was impossible. The artery itself had to be closed.

If a patient has good collateral circulation, other vessels can provide substitute service. In Moscow, however, studies showed the student's other vessels provided little help toward maintaining circulation. "The artery cannot be shut down," the doctors told him. "You would die."

Constantine learned that MGH specialists could solve his problem by first constructing a bypass graft to furnish an alternate blood flow. Then a balloon placed at the tip of a tube (catheter) could be fed from the groin through the patient's arterial system to plug the vessel containing the aneurysm.

Dr. Roberto C. Heros, Chief of Cerebrovascular Surgery, created the bypass, using a superficial temporal artery (a vessel whose blood flow one can feel by just touching the temple). Later, with the patient under local anesthesia, Dr. Gerard M. DeBrun, Chief of Interventional Neuroradiology, carried out the balloon technique.

The patient made a swift recovery. No longer burdened by the pressure of the aneurysm against his oculomotor nerve, he could once again control his eyelids, and full vision returned. More important, the skill of the physicians had erased the threat against his life.

The bypass technique was developed in the mid 1960s by a former resident in neurology and neuropathology at the MGH, Dr. R. M. P. Donaghy of the University of Vermont College of Medicine in Burlington; and Dr. M. Gazi Yasargil of the University of Zurich (*MGH News,* June–August 1976).

Dr. DeBrun developed the balloon procedure 10 years ago in France. Unknown to him, a member of the neurological institute in Moscow, Dr. Fedor Serbinenko, was devising a similar method at the same time.

Since installation of a vessel-closing balloon requires only a local anesthetic, the patient's tolerance of the shutdown can be quickly observed.

Dr. DeBrun's work, however, was aimed primarily at finding a way to deal with so-called arteriovenous fistulas. These are abnormal passages between a vein and an artery which might be present at birth or caused by an accident of some kind.

Often occurring at the base of the skull, an area difficult for surgeons to reach, the fistulas allow arterial blood to enter the vein, causing it to swell. The patient's eyes bulge and sounds, like those of a passing locomotive, roar through the head.

"Before Dr. DeBrun's technique became available, we had to occlude [block] the carotid artery in treating fistulas," Dr. Heros said. "Now in about 80 percent of these situations we can close a fistula with a detachable balloon placed in the vein and thereby preserve the blood flow through the carotid artery."

Although in eliminating giant aneurysms the balloon does not save the affected artery, Dr. DeBrun's method improves on a clamping technique employed for many years to block off dilated vessels.

First of all, clamping requires a fully equipped operating room with general

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stration meals, volunteer health workers persuaded the parents that such beliefs are untrue.

Turning to immunizable diseases, Dr. St. Louis termed measles one of the single greatest preventable causes of malnutrition in the developing world. And in pockets where hygiene is severely lacking, he said, there are enormous losses of life from tetanus infections in the newborn.

The tetanus can be prevented, the doctor said, by giving mothers immunization shots before and during pregnancy.

Immunization against tetanus, measles, and other illnesses is available in Indonesia. Yet Dr. St. Louis discovered that most people were unaware of this. He launched a campaign to inform them, even sending out health vehicles to bring the people in for their shots. As a consequence, the immunization rate rose in at least one region by 300 percent.

Throughout his stay in the Southeast Asian country, roughly as wide as the United States, Dr. St. Louis found that improving health conditions was not so much a matter of knowing the latest technology but rather of convincing the citizenry to follow the right path. ■

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Balloon Technique Reduces Hospital Stay

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anesthesia for the patient. The surgeon clamps the problem artery at a point in the patient's neck because the aneurysm is inaccessible for closer clamping.

The patient must later be taken to an intensive care unit because the clamp will need a periodic tightening. In all, the individual can expect another week in the hospital.

Dr. DeBrun can, on the other hand, perform the balloon technique in a radiologic treatment room with the patient fully awake, having received only a local anesthetic.

Channeled through the artery itself, the balloon can be positioned very near the aneurysm. The doctor can then briefly inflate the tiny latex bag with iodine to observe how the patient tolerates the vessel shutdown. If all goes well, the doctor detaches the inflated bag from the catheter and leaves the balloon in place. The patient can often go home two days later, feeling better sooner than with clamping, and saving several days of expensive hospitalization.

Regardless of whether the procedure involves a balloon or a clamp, a clot soon develops in the arterial space where the blood flow stopped. Since a clamp may lie some distance from the aneurysm, a clot forming in this closed-off area can be lengthy.

There is a small risk that part of the clot may one day break away, travel through the other end of the artery, and precipitate a stroke. That is less likely to occur with a smaller clot resulting from employment of the balloon.

"We use the clamp these days only in patients who cannot tolerate an abrupt balloon occlusion," said Dr. Heros, who is also Associate Professor of Surgery at Harvard Medical School. "If, during testing with a balloon, the patient shows particular signs of weakness or difficulties with speech, then we know the arterial shutdown has to be gradual."

Specialists in both the balloon and clamping techniques hesitate to compare them in terms of success rates. "We really cannot reach any statistical conclusions yet," Dr. Heros said. "We have to work on more patients and record longer follow-ups."

He did emphasize that the balloon process is difficult to carry out. It should be restricted, he believes, to skilled doctors who have undergone intensive training in the work.

Dr. DeBrun, who is Visiting Professor of Radiology at Harvard Medical School, taught his technique for several years at the University of Western Ontario at London, Ontario, before coming to the MGH in 1982.

Representing about 10 percent of all aneurysms, giant aneurysms do not always defy the neck-clipping treatment given the smaller ones.

A year and a half ago, a woman in Maine realized that she was gradually losing the vision in her left eye. Four times thereafter she obtained stronger eyeglass lenses. When she finally consulted an eye physician on the advice of her optometrist, she had virtually lost the sight of her left eye.

The physician ordered a CT (computerized tomography) scan which detected an apparent tumor. Referred to the MGH, the 46-year-old patient underwent another test, an angiogram (a type of X-ray procedure designed to show blood vessels). It revealed, not a brain tumor, but a giant aneurysm.

Dr. Heros and his team operated, not knowing whether the sac could be clipped or whether the patient would need closure of the artery. Initial studies showed poor substitute circulation had developed in other arteries. Therefore a bypass graft would have to precede any arterial blockage.

In November 1984, after drilling some bone at the base of the skull, the team was able to maneuver a clip onto the aneurysm, thus saving the artery.

By the time the patient left the hospital a week later, she had already regained 30 percent of her vision. Dr. Heros remarked, "It may get significantly better." ■

Angiogram of Greek student's brain reveals giant aneurysm, or ballooning, on the internal carotid artery, causing it to press on a nerve controlling eye muscles.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 2 March, 1985

Reaching Out to Lower Burdensome Medical Costs

Impulsive, moody, easily distracted, the child with Attention Deficit Disorder often fails to benefit from traditional treatment.

A New Way to Treat Troubled Children

Three to five percent of America's school-age children suffer from a type of psychological distress which can persist throughout life.

Despite studies illustrating the magnitude of the problem, only about 10 percent of the youngsters come under medical care, and even within this group, 30 percent fail to respond to prescribed medicines.

Physicians rely for the most part on psychostimulant drugs, first developed in the 1930s, to treat the condition, known as Attention Deficit Disorder (A.D.D.).

Once called hyperactivity, A.D.D. acquired its new name because many affected children are not hyperactive at all. In fact, inattentiveness and impulsivity are the most common symptoms. Others include moodiness, poor judgment, and, in a high percentage of patients, learning disabilities.

For those patients deriving little help from stimulants, no effective alternative medication has been available, but the outlook appears potentially brighter. Early investigations conducted in the MGH's Pediatric Psychopharmacology Clinic show that many children who fared poorly on stimulants benefit from desipramine, a type of antidepressant drug.

Dr. Joseph Biederman, Director of the clinic, said no one can explain why one child will improve on a stimulant while another will not, but a major shortcoming

(Continued on Page 2)

Amid pressures from both public and private sectors to brake rising medical costs, the MGH is following the progress of a health unit it runs in a nearby home for the elderly.

By identifying closely with the residents and immediately meeting their medical needs, the unit minimizes the likelihood that problems among the residents will worsen and at some point mandate potentially expensive hospital stays.

The success of the health service, conducted quietly since 1979 at The Blackstone on neighboring Blossom Street, already has set the stage for similar MGH operations elsewhere in Greater Boston, as well as an expansion of visits by nurses to patients in private homes.

Each Monday morning, Mary T. Ryan, RN, of the MGH's Wang Ambulatory Care Center, walks the few yards to the 11-story Blackstone and sees a dozen or so of its 175 residents. As a nurse practitioner certified by the American Nurses Association, she is specially trained to diagnose, evaluate, and treat a wide range of physical conditions. Patient education is also a prominent factor in most visits.

Many patient visits involve follow-up examinations for common chronic disorders. These may require drawing blood samples for MGH laboratory measurement of sugar content, such as in the case of diabetics, or of potassium levels, an important test for patients with high blood pressure who take diuretics to speed excretion of excess sodium.

Miss Ryan, whose credentials include a master's degree in gerontology, also handles numerous acute conditions, e.g., attacks of the flu, flareups of bronchitis, complaints of weak spells, and injuries resulting from minor mishaps.

Although Miss Ryan routinely visits

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EDITORIAL:

Treating the Patient at Home

A concern for costs has spurred a movement away from hospitalization. First the concern spawned a trend toward ambulatory procedures. Health care reserves inpatient surgery for more serious procedures. Similarly patients who once spent weeks recovering in hospitals often go to nursing homes for a greater part of their recuperation. Less skilled nursing homes exist for patients with less demanding illnesses. Convalescent and rest homes care for people who cannot live at home but who do not require frequent nursing care.

The logical next step is to treat the patient at home. A few years ago the MGH pioneered something called adult foster care or family care. This involves matching an elderly patient without a nearby relative to someone trained by this hospital to provide simple care for the patient in the caretaker's own home. Other hospitals are now establishing similar programs.

This issue of the *News* describes still another alternative. In this, MGH professionals are going into apartment buildings in which the elderly tend to reside. The older residents delight in receiving, in their own buildings, care otherwise available only in the hospital. Based in the MGH's neighborhood health centers and its Spaulding Rehabilitation Hospital exist other variations on the same theme.

Now the MGH is pulling many of these diverse elements together in a Coordinated (Home) Care Program. Experimental, this has just been funded by a generous grant from the Robert Wood Johnson Foundation. Emerging from this and other studies around the country may come several models for delivering quality care in private homes. The concept is sound. Nevertheless, in its zeal to keep costs low, the health care community must guard against the pitfalls of second-rate care. Ensuring high level medicine must be a sine qua non.

With this trend toward treatment in the home comes an irony. In the 19th century American hospitals arose out of a need to treat the poor. The more wealthy, when ill, remained in their homes. Hospital treatment as a classless phenomenon is, therefore, a comparatively modern invention. Home care thus represents a return to the past. What remains to be seen is how well it functions in an era of explosive medical technology.

Single Dose of Drug Offers Lasting Relief To A.D.D. Children

(Continued from Page 1)

of these drugs—among the oldest of psychotropic or mind-altering medications—is that their effects wear off after only a few hours.

"This raises a problem of compliance," he said. "A child may frequently forget to take his medicine and become fed up with reminders, which, in effect, tell him that he is different from others his age.

"Our goal has been to find a drug which not only will treat the disorder but also can be given once a day to assure the child's stability around the clock."

In one study, published last July in the *American Journal of Psychiatry,* the clinic's team reported on a dozen adolescent A.D.D. patients who were treated with desipramine. All but one had previously responded poorly to stimulants.

The team wrote that 11 of the adolescents, aged 12 to 17, improved within a month after beginning desipramine, and this improvement was sustained for 6 to 12 months without significant adverse effects in 9 of the youngsters.

In a subsequent study involving 14 children aged 6 to 11, Dr. Biederman and his colleagues again found improvement occurring within a month's time and sustained for up to a year without significant side effects.

Dr. Biederman cautioned, however, that the results are early and need corroboration.

The clinic director told of a boy who came to his attention at the age of 8. The child had exhibited symptoms of A.D.D. for several years and was taking stimulants without benefit. Fidgety, agitated, unable to develop friendships or even get along with his own family, a failure in school, constantly moody, always clinging to his mother, the boy had an additional complicating problem: At age 6 he began experiencing periodic seizures after a baseball struck him on the head.

The child's parents so despaired of daily confrontations with him as well as innumerable conferences in school that they required psychiatric assistance for themselves.

Once on desipramine, the son's entire attitude began to change. He stopped fidgeting. His moodiness disappeared. He

Photographs: Myron Daniels

Drawings: Pages 1, 3, Al Laoang, National Institutes of Health

Dr. Joseph Biederman with a patient whose Attention Deficit Disorder has responded dramatically to a new treatment

became more attentive. Almost 11 now, he is at last a happy child.

"Attention Deficit Disorder is a chronic condition which will not completely evaporate," said Dr. Biederman, who is also Assistant Professor of Psychiatry at Harvard Medical School. "As a child becomes older, he may fidget less, but his impulsivity and inattentiveness may continue throughout life.

"We usually give medicine until the patient feels well, develops a more positive perspective on life, and can work with his teachers. The child may be able to go without drugs for a year, then need them again for a time."

As effective as various drugs may be in treating A.D.D., they also have deficiencies. For example, methylphenidate, one of the leading stimulants prescribed for improving concentration, also can produce euphoria.

"To give an adolescent with impulsivity and poor judgment a drug capable of creating a 'high' increases potential for abuse," Dr. Biederman said.

As for desipramine, it can affect the heart if taken in excess, but the MGH child psychiatrist pointed out that the medicine can be given only once a day. "Thus its administration can be easily supervised," he said. "Given in proper doses, the drug causes no known toxic problems."

Desipramine is a primary component of imipramine, an antidepressant used to treat school phobias (refusal of children to go to school) and bed-wetting.

Found less likely to produce such side effects as constipation, dry mouth, or blurred vision, desipramine is well tolerated by both children and elderly people.

For some children with A.D.D., drugs may not be a part of the treatment. Some youngsters react well to psychotherapy, others to purely educational maneuvers, such as tutoring.

Dr. Biederman believes that to address all liabilities, adequate treatment should really consist of both educational and psychological support as well as drugs that can deal with biological disruptions.

A.D.D. children who receive no help of any kind face severe liabilities.

"If youngsters do poorly in school and consider themselves failures, what options do they have at 17 or 18?" Dr. Biederman asked. "They can't go on to college or get a good job, and they may not attempt either.

"Researchers at rehabilitation centers have studied patients who used drugs and/or alcohol. The investigators reported that as many as 30 percent of the patients possessed a childhood history of Attention Deficit Disorder."

In the past, A.D.D. often went undetected in children whose behavior did not include excessive motor activity. Teachers frequently regarded them as lazy. The youngsters, in effect, found themselves in double jeopardy, unable to do their school work and at the same time accused of deliberately avoiding it.

A number of studies, including work conducted at the MGH, lend weight to a theory that a tendency toward A.D.D. may be inherited.

Dr. Biederman said all of the studies found a higher risk of A.D.D. among relatives of such patients than in the general population.

"We have about 50 A.D.D. patients ranging in age from 4 to 17 on desipramine," he said, "and about half of the brothers and sisters of these patients also have symptoms of the condition.

"We have even encountered families in which the mother, father, grandparents on both sides, and all of the children had the disorder."

In addition to investigating possible genetic factors behind A.D.D. and the objectionable features of certain drugs, the pediatric psychopharmacology group plans a study formally comparing the effectiveness of desipramine against A.D.D. with that of methylphenidate.

"We know from some 100 studies conducted over many years that methylphenidate works, and five studies have demonstrated the value of imipramine," Dr. Biederman said. "Until recently, that was the extent of the research.

"When one considers that the disorder affects at least three percent of America's youngsters, an incredibly large number, the work must go on until we determine whether desipramine should become a drug of choice." ■

Assisted by Dr. Steven Jacoby, Dr. Peter Block (left) prepares to guide a balloon-tipped tube through a patient's major artery to his heart.

Using Balloons to Repair Heart Vessels

To keep fit, Americans in unprecedented numbers not only are watching their weight, exercising more, and smoking less, they are also calling on their doctor earlier when symptoms of a possible heart condition arise.

"Cardiologists are seeing many more younger people than before and with symptoms that are not as longstanding as those of previous patients," said Dr. Peter C. Block, Director of the MGH Cardiac Catheterization Laboratory.

"In addition, more and more patients who had heart attacks at a relatively young age are seeking evaluation of their coronary arteries."

The use of a special X-ray procedure that shows the condition of blood vessels in the heart—coronary angiography—has risen across the country.

In part, Dr. Block attributes this to the ability of a relatively noninvasive coronary procedure, developed in Switzerland in 1977, to eliminate blockages in vessels before a heart attack strikes.

He was referring to coronary angioplasty, a technique in which the expert threads a tube (catheter) with a deflated balloon at its tip through a patient's arterial system to a narrowed vessel in the heart. Inflation of the balloon reopens the artery channel, allowing resumption of more normal blood flow. The balloon can then be withdrawn.

If all goes well, the patient can usually go home the next day and immediately resume full activity. In contrast, a patient undergoing coronary artery bypass surgery must spend a week to 10 days in the hospital postoperatively at considerable additional cost.

Dr. Andreas R. Gruentzig, now of Emory University Hospital in Atlanta, developed the angioplasty concept. He used the balloon technique first to treat leg problems, then miniaturized the system to deal with the coronary arteries.

Since Dr. Gruentzig performed the first coronary angioplasty more than seven years ago, use of the procedure has spread worldwide. More than 84,000 heart patients in the United States alone underwent angioplasty in 1984.

Dr. Block was among the first 10 physicians in the world to apply the technique to heart patients. He first employed the balloon method in the spring of 1978. Since then, he has treated close to 300 individuals.

At first, only about five percent of coronary patients were deemed eligible for an angioplasty. Today, that figure stands at about 20 percent.

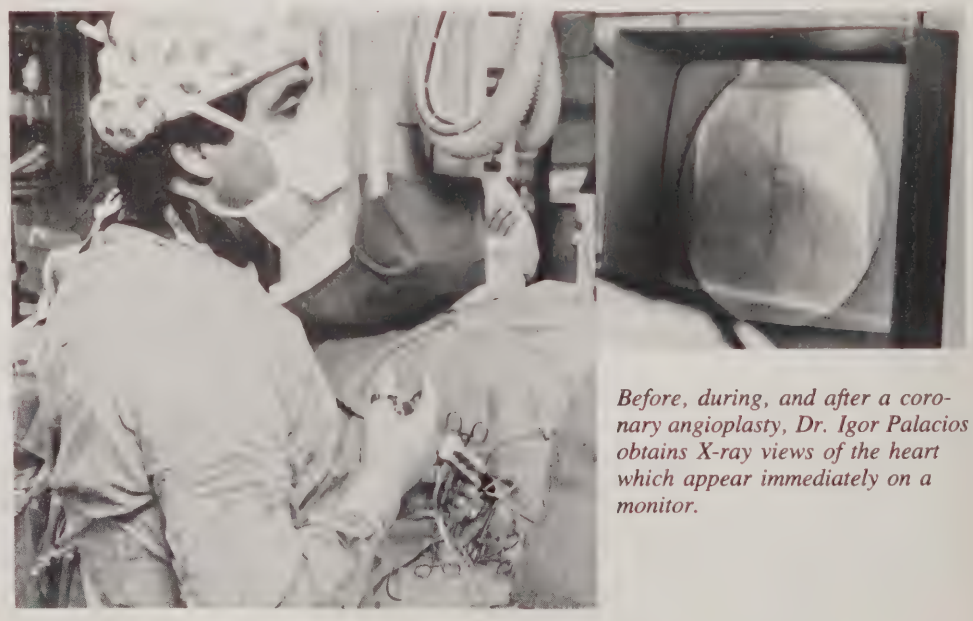
The strict criteria did not reflect an element of danger. Instead, the rules were aimed at confining candidates to those on whom the results of an angioplasty could best be evaluated.

"By limiting the procedure, for example, to people who had only one narrowing in one coronary artery," Dr. Block explained, "we could tell whether or not narrowing had been improved simply by noting if subsequent exercise tests demonstrated a relief of symptoms."

This made more sense, he said, than to do the procedure initially on complicated disease, obtain a good result, and assume that since the condition looked improved, the technique had to be a good one. "We wanted some scientific basis on which we could base the usefulness of the method," he said.

Once specialists had demonstrated its usefulness, they very quickly expanded the indications for coronary angioplasty to patients with more widespread disease.

At the MGH, doctors continue to be very conservative. They will schedule an angioplasty for patients with single-vessel disease, some with discrete lesions in two of the heart's three major arteries, and, in rare situations, for patients with three-vessel disease, trying to repair what appears to be the most serious of the three narrowings.



Before, during, and after a coronary angioplasty, Dr. Igor Palacios obtains X-ray views of the heart which appear immediately on a monitor.

Improved Diagnosis Of Poor Swallowing Brings Better Care

At the Massachusetts Eye and Ear Infirmary, Dr. Alfred Weber discusses a Modified Barium Swallow test with (from left) Sarah Wilson Ciambrone and Joan Kelly, MGH speech-language pathologists.

When disease or injury interferes with normal function of the nervous system, a secondary affliction often sets in, complicating the patient's recovery.

The ability to swallow, in large part an automatic reflex, may suddenly become difficult and emotionally overwhelming. Eating is not only essential to life but is also an inherent part of socialization.

In addition, loss of the ability to swallow can create a potentially life-threatening situation since food may enter the lungs instead of the stomach.

Until only a few years ago, swallowing difficulties, known as dysphagia, were often diagnosed inadequately, at times leading to surgery. Today, MGH speech-language pathologists and radiologists at the neighboring Massachusetts Eye and Ear Infirmary (M.E.E.I.) engage in a collaborative procedure that permits a highly detailed evaluation of dysphagia.

By pinpointing the specific cause of the problem, the technique usually clears the way for effective nonsurgical care that also shortens hospital stays and saves the patient money. Once a patient is on the road to recovery, family members can be trained to provide care at home.

This diagnostic procedure, called a Modified Barium Swallow, involves attaching a videotape recorder to fluoroscopic X-ray equipment. The process of swallowing is observed from the entrance of contrast material (barium) into the mouth, then through the throat (pharynx),

(Continued on Page 6)

"There are other patients with very complex coronary disease who, in my point of view, are not good candidates for angioplasty," Dr. Block said. "These include patients whose coronary arteries have long areas of narrowings, multiple areas of narrowings, or complete blockages that are not of recent origin."

For such individuals, and the number is large, Dr. Block recommends grafts to bypass the problem areas. Today, a patient commonly undergoes three or four bypasses in a single operation. The number can reach as many as six or seven.

Dr. Block and his colleagues will on occasion perform an angioplasty to help a patient overcome an acute heart attack. But at the MGH the major research thrust to treat acute heart attack is being conducted by Drs. Herman K. Gold and Robert C. Leinbach.

In conjunction with cardiologists at Johns Hopkins Hospital in Baltimore and Barnes Hospital in St. Louis, Drs. Gold and Leinbach have been evaluating a naturally occurring protein called tissue plasminogen activator (TPA) as a clot dissolver.

Using a genetically engineered copy of TPA, doctors have virtually stopped heart attacks in 35 of 49 patients. Clots disappeared in 30 to 45 minutes after intravenous infusion of the drug.

An older drug, an enzymatic medication called streptokinase, also dissolves clots effectively, but it has an impact throughout the body, thus opening the way for possible unwanted bleeding. TPA, on the other hand, confines its action to the target site.

Three or four days after TPA does its work, doctors can perform an angioplasty to eliminate the vessel narrowing that led to the clot formation.

Prior to use of the drugs, many people wondered what happened to the clotted material when angioplasty reopened a vessel. Most investigators agree that as the balloon inflates it does not compress the atherosclerotic plaque against the artery's walls but, instead, splits and stretches out the plaque even as the walls also expand.

"If we can enlarge the artery's lumen [channel] so that it equals the size of the vessel's remaining cavity, we will have achieved a perfect result," said Dr. Block, who is also Associate Professor of Medicine at Harvard Medical School, "but most of the time after working on, say, an 85 to 90 percent narrowing, we are still left with a 20 or 30 percent constriction."

The MGH cardiologist also said that in about 30 percent of angioplasty patients the expanded lumen eventually shrinks again. However, repeat angioplasty succeeds 85 to 95 percent of the time. Also, reblockage after an angioplasty rarely occurs once a year has passed.

In comparison with the balloon technique, of some 160,000 coronary bypass procedures performed annually in the United States, blockages develop the first year in 5 to 10 percent of the grafts. A 2 percent per year attrition rate follows so that at the end of five years, about 15 percent of the grafts have closed. If the blockage is detected while only partial, an angioplasty can prove beneficial.

Various medical centers in this country plan studies to formally compare the value of angioplasty versus bypass surgery in dealing with specific coronary disorders, but, regardless of the outcome, Dr. Block does not see angioplasty becoming more common than bypass surgery.

"Angioplasty may help patients for a number of years," he said, "but coronary atherosclerosis is a progressive disease and will eventually return with possibly even greater severity.

"Bypass surgeons, therefore, will be faced with a slightly older population of patients who are either no longer candidates for angioplasty because of extensive disease or who had the procedure only to find that it just delayed final repairs." ■

Nerve Injuries May Disturb Swallowing

(Concluded from Page 5)

and finally into the food pipe (esophagus).

The team uses the contrast material in three forms (a liquid, a paste, and a cookie covered with paste) to assess how the patient manages different food textures. By videotaping the procedure, the team can review the study repeatedly to make an accurate diagnosis and treatment recommendations.

Instead of a cupful of barium, used in the traditional barium swallow, the new procedure uses only a half teaspoon per swallow, thus minimizing the chance of harmful aspiration by the patient.

Members of the MGH Speech–Language Pathology Department, directed by Julie Atwood Wheelden, see up to 70 inpatients each week at the MGH, the M.E.E.I., and at the affiliated Shriners Burns Institute. About 60 percent have swallowing problems.

The specialists also care for dysphagic patients on an ambulatory basis at the MGH and its satellite health centers in Charlestown, Chelsea, and Revere.

Dysphagia most often stems from damage to specific nerves in the head. Of a dozen cranial nerves, five have a marked influence on chewing or swallowing by affecting muscle control, transmittal of taste and sensation, production of saliva, and regulation of gag reflexes.

Most commonly, dysphagia follows a stroke, the blockage or rupture of a blood vessel in the brain. Cranial palsies, elevated pressure in the head, smoke inhalation, and head or neck surgery, such as for removal of a tumor, may lead to swallowing difficulties.

Dysphagia may also coincide with such neuromuscular maladies as Parkinson's disease, myasthenia gravis, Guillain-Barré syndrome, or Lou Gehrig's disease (amyotrophic lateral sclerosis).

"Originally, the diagnosis of swallowing problems depended almost entirely on an oral examination," said Sarah Wilson Ciambrone, an MGH Senior Speech–Language Pathologist. "That yielded insufficient information. The next step was the barium swallow, but the traditional X-ray test showed only the esophagus on down. No one X-rayed from the esophagus on up. Now there is a systematic way of analyzing a movement disorder in the mouth and pharynx."

The Modified Barium Swallow originated in Chicago. Working under a grant from the National Cancer Institute, Jerilyn Logemann, Ph.D., now Chairman of the Department of Speech–Language Pathology at Northwestern University, and Dr. B. Jay Hill, Chief of Radiology at Mercy Hospital, devised the plan as a way to evaluate cancer patients.

Seeing wider practical applications, Dr. Logemann began using the new test with the neurologically impaired. At the same time, she initiated a program to train colleagues in the new state of the art.

A member of Dr. Logemann's second training class was Lisa A. Newman, already a certified speech–language pathologist. She joined Mrs. Wheelden's department in December of last year after using the Modified Barium Swallow for six years at Mercy Hospital.

Speech–language pathologists diagnose and treat dysphagia because the mechanism involved in swallowing is the same as that controlling speech. Mrs. Wheelden and her team work with the M.E.E.I. Radiology Department, directed by Dr. Alfred L. Weber, because it has considerable experience in X-raying head and neck problems.

"We operate the equipment while the speech–language experts administer the barium," said Dr. Weber, who is also an MGH Radiologist. "Together we then analyze each swallowing action to see where there appears to be a deviation from the normal."

Miss Newman added, "We first administer the liquid barium by the teaspoonful and never compromise the patient. Occasionally because of poor tongue movement, food or liquid may go over the back of the tongue before the pharynx has adopted a reflex position to protect the airway. Prior to the development of the Modified Barium Swallow, no one looked at the influence of tongue movement on aspiration."

If no problems develop with the liquid, the team next administers a barium paste equivalent in consistency to pudding. After that test comes ingestion of a cookie coated with barium paste for analysis of the patient's ability to both chew and swallow.

When results of the modified barium study confirm that it is safe for the patient to eat, the speech–language pathologist, working closely with the dietitian and nurse, gears the types of foods given to each individual's swallowing tolerance and nutritional needs. Depending on the primary disorder, the patient may react adversely at first to liquid or to solids.

"In most instances, the patient should be assisted to a proper head and body posture for eating, and feedings should proceed slowly, the food given in small amounts," said Speech–Language Pathologist Joan Kelly. "The therapist can also teach the patient techniques to keep the airway closed while eating."

Prior to development of the Modified Barium Swallow, a nurse often worked in a vacuum, unaware of the patient's potential for aspiration. The new approach to swallowing therapy has resulted in the establishment of both an effective and efficient MGH interdisciplinary team.

A speech–language pathologist visits each patient regularly to evaluate progress and determine any need for further intervention. Close cooperation among the nurse, dietitian, and the speech–language pathologist speeds the results and facilitates eventual transfer of care responsibility to nurses and, after discharge, to family members. ■

As dysphagic patient Michael Zubarchook eats, Speech–Language Pathologist Lisa Newman feels his larynx to determine if his swallow reflex is taking place.

Nurse Practitioner Mary Ryan listens closely as Sheila O'Shea of The Blackstone outlines a physical problem.

Full MGH Backing for Nearby Health Unit

(Continued from Page 1)

The Blackstone only one morning a week, she stands ready at any time to consult with residents by telephone from her hospital office, receive them at the hospital for examination, or make a special trip to a resident's own apartment.

When on occasion situations arise that require a physician's services, Dr. Richard G. Pingree, an MGH internist, provides backup, seeing patients either at the hospital or, if advisable, at the Blossom Street home. He also arranges for X-ray, ECG (electrocardiograph), and other tests at the MGH.

Miss Ryan consults with Dr. Pingree on all prescription medications that she deems necessary. He fills out the formal authorization.

Some 50 to 60 residents at The Blackstone regularly avail themselves of the MGH's health services. Of this group, 85 percent lacked a personal physician before the program began.

The State Street Development Management Corp. recognized the need for an on-site medical service when it bought the old, unused Blackstone Grammar School, razed it, and erected the new building on that plot. The architectural plans even allotted space for a health service.

"The average age of the first tenants ranged between 66 and 70," said Mary Lou Walker, the company's Director of Tenant Services. "Since the occupancy turnover is very small—only about two percent annually—most of the residents are now between 71 and 75."

She said that if the tenants feel ill they hesitate to leave the building, even to travel a very short distance, but they are not reluctant to visit the medical quarters on the first floor to see Mary Ryan and to obtain her advice.

With full resources of the MGH at her disposal, Miss Ryan provides health care for more than 50 residents of The Blackstone.

"Many of the tenants were acquainted with Mary before the building was constructed," Miss Walker said, "because they had resided in this neighborhood. When our company first proposed this structure, the firm promised a local community group to give housing priority to former West End residents who had been displaced by urban renewal."

As the occupants get older, Miss Walker added, it is a big advantage to have community resources available which can prolong an individual's stay and independence rather than see someone having to transfer to a nursing home.

The late Eleanor Clark, for many years MGH Director of Social Service, and Ruth Farrisey, RN, who retired two years ago as Associate Director of Nursing for the Ambulatory Care Division, figured prominently in establishment of the Blackstone health unit. With its success, they subsequently led efforts to apply the concept elsewhere.

"We supervised certain patient populations before it became an obvious way to manage health care," said Kathi Tracy, RN, who succeeded Miss Farrisey upon her retirement. "Thus, through the foresight of people like Miss Clark and Miss Farrisey, we were developing methods to offer high quality care in an accessible, cost-effective way before these issues became so critical."

In addition to her responsibilities at The Blackstone, Mary Ryan keeps abreast of health needs at a 136-apartment complex on Beacon Hill. She serves as a liaison between the MGH and residents of Beacon House.

"Mary has been very effective in coordinating medical services for our people," said Gerda Conant, the project's manager. Just as at The Blackstone, many of the elderly or disabled tenants had no primary care physician until a link was established with the MGH.

The manager calls Miss Ryan when an emergency arises or a tenant asks for medical attention, and the MGH nurse practitioner makes all the arrangements. She may even call on the tenant.

A health facility was suggested for Beacon House, but a sizable proportion of its residents are middle-aged and either work or travel. The prospective number of patient visits for the unit thus did not warrant such an operation.

The MGH does have another interest in Beacon House, however. It leases more than a dozen apartments there to accommodate out-of-town families which have

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Early Medical Care Can Avert a Crisis

(Concluded from Page 7)

loved ones under care at the hospital.

Contacts have been made with the Amy Lowell House, another home for the elderly near the MGH, regarding establishment of health services there. The building, situated in Charles River Park, has a population much like that of The Blackstone and would have a similar medical arrangement.

Even as the hospital concerns itself with providing general health care to the occupants of several nearby housing developments, the MGH is moving ahead on other fronts.

For the past year, it has engaged in a long-term program to better meet the health needs of 250 patients 65 and older who have been classified as high-risk for repeated hospitalizations or institutional care due to complicated medical problems.

Under a grant from the Robert Wood Johnson Foundation, MGH teams consisting of a nurse and a social worker have followed the patients through their hospital stay to care at other facilities or at home. The teams work closely with each patient's primary care physician.

The late Eleanor Clark said when the grant was announced that "one of our goals is to prevent crises. We believe that a proactive, rather than reactive, team of very observant professionals can help the patient take care of symptoms before a crisis occurs and hospitalization becomes necessary."

All of the patients in the program live in Chelsea, Revere, or Charlestown where the MGH maintains neighborhood health centers.

A year ago when the Spaulding Rehabilitation Hospital in Boston became a part of the MGH, the way was cleared to establish an expanded program of home care services. The benefits of the acquisition by the MGH included a home health care license.

"Close collaboration between the MGH and the Spaulding Hospital will facilitate improved continuity of care," Kathi Tracy said. "Such continuity is possible when a team of clinicians can be accessible to patients through all phases of wellness and illness."

A satellite office of the Spaulding Home Care Program has been established at the MGH's Chelsea Memorial Health Care Center to facilitate home service to patients in that community. In addition, the center continues to provide health care regularly at two developments for the elderly in Chelsea.

In Revere where the MGH maintains a center known as the MGH–Revere Health Associates, generalized home visits are not yet under way, but an interpreter, acting on behalf of the center, keeps in close touch with the city's large population of Southeast Asian refugees to be sure their health needs are met.

At the MGH–Bunker Hill Health Center in Charlestown, three nurses employed by Boston's Department of Health and Hospitals are available full time for home visits.

"Bunker Hill has a nurse practitioner who follows a large, elderly population in private homes and two public health nurses who make home care visits to both adults and children," Miss Tracy said.

In Boston's heavily populated North End, the privately operated North End Health Center provides care in the home. MGH representatives have been consulting with that center's officials, however, on how the hospital might be able to augment the home services.

Regardless of whether a patient receives health care in a medical unit or through a home visit, the full resources of the MGH stand behind the professional providing that care. Patients often become less fearful, knowing they are now part of the hospital system. ■

Joseph Briand, confined to bed at The Blackstone, is visited by Dr. Richard Pingree, MGH internist.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 3 April, 1985

Test Lessens Perils of an Out-of-Place Pregnancy

Transferring Parts to Save a Child's Leg

Constantia Georgiou turned 2 years of age this month, but in a manner of speaking she was just beginning to live.

A captivating child with large, glistening eyes that convey an irresistible warmth, Constantia, nicknamed Connie, was born in Cyprus with an orthopedic disorder that has perplexed doctors ever since it was first described 277 years ago.

Connie has never walked. She was stricken by a disease that initially affects blood vessels around bone, often a limb, and then spreads to the bone itself, preventing normal development. If a fracture occurs, the break usually fails to heal properly, and the limb becomes deformed.

The little girl had this experience with her right leg, and the break was never corrected. Sometimes a fracture occurs even before birth, but no one can say whether this happened to Connie. Born into a very poor family living in the southern Cypriot port city of Limassol, she had never had the good fortune of being examined by a specialist.

In previous instances of the disease, known formally as pseudarthrosis (meaning false joint), as many as half of those stricken have had to undergo amputation following futile courses of treatment.

Connie's own outlook appeared bleak until several months ago when she came to the attention of a group of American doctors vacationing on the Mediterranean island.

They examined Connie and diagnosed her rare condition as *(Continued on page 4)*

Two-year-old Constantia Georgiou of Limassol, Cyprus, who underwent unusual surgery to save her right leg

A study conducted at the MGH three years ago is helping to prevent the devastating effects of an increasingly common reproductive disorder.

In recent years, ectopic, or "out of place," pregnancies have increased nearly threefold in the United States. The incidence has reached as high as one such pregnancy for every 32 live births.

But even as the levels rose, maternal deaths from these abnormal pregnancies declined. In 1980, the disorders accounted for 14 percent of all maternal fatalities. Today, the toll stands at an estimated 6 to 10 percent.

"It used to be that 85 percent of ectopic pregnancies were discovered only after a fallopian tube had ruptured, endangering the patient's life," said Dr. Neil D. Jackson, an MGH gynecologist. "The figures have since reversed. We now identify about 85 percent of such pregnancies before a rupture has occurred."

To a large degree, credit for the downward mortality trend belongs to a young English gynecologist. While undergoing training at Yale–New Haven Hospital and later at the MGH, Dr. Nicholas Kadar conducted research which led to an additional use for a highly sensitive pregnancy test devised in the late 1970s by scientists at the National Institutes of Health (N.I.H.).

Dr. Kadar's work, financed here with research funds of the Vincent Memorial Hospital, the gynecological unit of the MGH, demonstrated that the N.I.H. test not only can diagnose pregnancy but can also detect an ectopic pregnancy as early as six days after conception.

The test, called a beta-hCG radioimmunoassay, determines the blood level of human chorionic gonadotropin, a hormone produced by fetal developmental

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EDITORIAL:

The Thing We Think We Think

As MGH departments go, psychiatry is young. It recently observed its 50th Anniversary. In contrast some services originated when the hospital opened its doors to patients in 1821.

One reason for the late start comes from the fact that the MGH was chartered in 1811 as the parent corporation for McLean Hospital. McLean opened to patients in 1818 and until 1934 served as the primary place to hospitalize MGH psychiatric patients.

Despite its youth the General's Psychiatry Service has distinguished itself. A page 7 article chronicles some of the milestones. The birth in 1934 came during the seminal revolution sweeping psychiatry. Freud's teachings were the rage of Europe. So much so that the British satiric magazine *Punch* could not resist noting that without psychoanalysis we should never know that the thing we think is not the thing we think we think but only the thing that makes us think the thing we think we think.

The ardor for psychoanalysis in recent years has cooled, but it has not been extinguished. In fact, psychiatry verges on another revolution, the biological explanation of psychiatric illness. Evidence has been accumulating that at least some psychiatric illness has a physical basis. It is not entirely clear that the mechanism is simple, even in those diseases. For example, does a chemical change in the brain initiate certain psychiatric disease? Or does a change in thought process or attitude provoke a hormonal response that in turn directly or indirectly causes the mental illness?

These are difficult questions. Laboratories around the world are trying to cope with them. With the answers may come vaccines and/or medications to prevent some forms of mental illness, and drugs to treat or cure others. This is an exciting time to turn 50.

Ectopic Pregnancies

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tissue.

"Dr. Kadar's studies in the Vincent Research Laboratories revealed that whereas the levels of hCG in a normal pregnancy double every two days, the increase of the hormone in an ectopic pregnancy is slower," said Thomas M. Badger, Ph.D., a neuroendocrinologist and director of basic research and the hCG laboratory at the Vincent Memorial Hospital.

The usual presence of abdominal pain and bleeding strengthens suspicions that the pregnancy is not a normal one.

By performing a visual examination of the interior of the abdomen, a gynecologist can confirm whether the pregnancy is indeed an ectopic one. To do this, he inserts through a small incision a special viewing device called a laparoscope.

Dr. Badger said that more than 95 percent of ectopic pregnancies involve one of a woman's two fallopian tubes. While traveling through one of those tubes en route from an ovary to the womb (uterus), the female egg (ovum) becomes fertilized. In an ectopic pregnancy, however, the ovum does not continue on to the uterus. Instead, the egg becomes implanted in the tube.

Dr. Jacquelyn S. Loughlin, an MGH gynecologist and member of the Vincent reproductive endocrinology team, said the failure of the egg to transport normally can be traced to a variety of possible causes: a history of pelvic inflammatory disease which may have scarred the surface of the tube, a congenital abnormality, a constriction of some sort, a previous tubal operation, or, to a limited degree, increased use of intrauterine devices.

Without surgical intervention, she said, the fallopian tube in time ruptures, ending the pregnancy but also threatening the life of the mother.

"As a natural consequence of conception, blood flow in the fallopian tubes and the uterus increases dramatically to accommodate nutritional demands of the pregnancy," she stated. "As a tubal rupture tears blood vessels, however, the flow becomes a hemorrhage, causing rapid loss of large volumes of blood."

Photographs: Pages 1, 3, 4, Myron Daniels; p. 7, courtesy of MGH Psychiatry Service; p. 8, MGH Archives

Drawings: Page 5, MGH Medical Art; p. 6, courtesy of Dr. Robert G. Ojemann

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Dr. Thomas Badger prepares blood serum for a test for evidence of an ectopic pregnancy.

Dr. Loughlin trained in the MGH Gynecological Service and the Vincent Laboratories and manages a practice specializing in the problems of fertility which often require tubal surgery.

Dr. Loughlin, who like Dr. Jackson is an Instructor in Obstetrics and Gynecology at Harvard Medical School, said an ectopic pregnancy can now be diagnosed so early that at the operating table the tissue might not even be large enough for the eye to spot.

Dr. Jackson recalled a patient whose assay was positive for an abnormal pregnancy but whose laparoscopy failed to detect anything wrong. "We waited 10 days," he said, "obtained another positive test result, and this time were able to locate the pregnancy in the tube, remove the tissue, and preserve the tube's anatomy."

A woman who suffers a tubal rupture from an ectopic pregnancy must be carefully observed if she becomes pregnant again.

"If an infection, for example, had led to some scarring or other abnormality in one tube, it's likely the problem also developed in the other tube," Dr. Jackson said.

"This does not mean that a couple should be discouraged from further attempts at having a child, but the wife should be forewarned that as soon as she suspects she is pregnant again, her doctor should be notified to confirm that she has a normal intrauterine pregnancy."

He told of a patient who ruptured her right tube and subsequently developed an ectopic pregnancy in her left one. Early detection enabled Dr. Jackson to salvage the second tube. Without speedy intervention, it would also have gone on to rupture, thus ending forever the wife's reproductive capabilities.

As it turned out, five months after the second unfortunate pregnancy the wife was expecting again. This time she progressed to a normal, full-term delivery.

Interestingly, even if one fallopian tube suffers irreparable damage, the second tube has the flexibility to operate from either ovary. At the time of ovulation, the healthy tube, the right or the left, will align itself close to the ovary from which an egg is to be released. The situation is not unlike that of a carotid neck artery which often will assume the work of another whose blood flow has become disrupted.

Some people confuse a miscarriage with an ectopic pregnancy. A miscarriage is the loss of an intrauterine pregnancy that has failed to generate properly. Some imperfection in the early differentiation of tissue, for instance, may have limited or halted growth. Nature then causes the uterus to discharge that tissue. One of every eight intrauterine pregnancies ends in a miscarriage.

As for an ectopic pregnancy, the word ectopic comes from the Greek *ektopos*, meaning *away from a place.* Although such a pregnancy most often occurs in a fallopian tube, ectopic pregnancy can develop in the abdominal cavity and even within an ovary.

"Instead of the egg being extruded from the little cystic space where it formed, it may remain, and sperm may find their way into the little opening to the sac where the egg was generated," Dr. Jackson said. "This is a more unusual kind of ectopic pregnancy, but it does occur."

Although ectopic pregnancies have been discovered as early as six days after conception, nature's timing can vary markedly. As many as 28 days may pass before the abnormal development be-

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Using a viewing instrument called a laparoscope, Dr. Jacquelyn Loughlin can examine the interior of a patient's abdomen and determine whether a pregnancy is ectopic.

Constantia Georgiou receives a visit from her two principal surgeons, Dr. Jesse Jupiter, left, and Dr. Matthias Donelan.

Healthy Leg Aids Repair of Abnormal One

(Continued from Page 1)

pseudarthrosis of the shinbone (tibia) in the right leg. But they were optimistic that she could be helped.

With the support of a Cypriot charitable organization—the George and Selma Paraskeviedes Foundation—the child was flown 5,500 miles to Massachusetts to undergo a highly advanced form of unusual corrective surgery. It entailed removing the diseased bone, blood vessels, and affected surrounding muscle and substituting healthy bone, vessels, and muscle taken from the patient's other leg.

Where numerous other procedures had failed, this one offered hope of finally overcoming the malady, the cause of which is still unknown.

Doctors at the MGH previously performed the new procedure on 17 patients ranging in age from 18 months to 50 years. The youngest, like Connie, suffered from congenital pseudarthrosis. Others had such problems as chronic inflammation of the bone (osteomyelitis), infected nonunion of bone, or bone loss following some injury.

Admitted initially to the Springfield unit of the Shriners Hospitals for Crippled Children, Connie was later transferred to the MGH-affiliated Shriners Burns Institute (SBI) in Boston for the surgery that was destined to last 14 hours. Known primarily for its care of young burn patients, the Boston center, staffed by MGH doctors, also has the skills to treat children with unusual abnormalities or deformities.

The task of repairing the child's leg fell to a surgical team headed by Drs. Matthias B. Donelan, an MGH plastic surgeon who is also Chief of Plastic Surgery at the SBI, and Jesse B. Jupiter, an MGH orthopedic surgeon. They were assisted by Drs. Howard Lipton, a microsurgical Fellow in Plastic Surgery, and Sharon Webb, Chief Resident at SBI.

"The amount of tibia we took out would fit into the palm of my hand," Dr. Donelan said, "but bear in mind that this was a young child. Her entire shinbone was only twice the length of what was removed.

"A free bone graft of the size needed to fill the gap would never have succeeded. But there was a distinct advantage to putting in a living section of bone together with its own intact blood supply."

The bone the surgeons used as a replacement was a four-inch portion of fibula, the other of two main bones in a lower leg. Whereas a tibia's main job is to bear weight, a fibula acts as a shock absorber for the ankle and as a source for muscle attachment.

In planning a so-called free vascularized transfer, surgeons most commonly turn to a fibula, rib, or portion of pelvic bone (iliac crest). Dr. Jupiter said that by virtue of its length and structural and mechanical characteristics, the fibula is considered best suited for the reconstruction of long skeletal defects. The rib and pelvic bone have proved especially effective in lower jaw (mandibular) reconstruction.

Being a very sound bone, the fibula provides stability as soon as it replaces a diseased tibia segment.

"One of the exciting things about this," Dr. Jupiter said, "is that the fibula, which normally does not experience a lot of

Ectopic Pregnancies

(Concluded from Page 3)

comes evident.

Dr. Badger, who is also Associate Professor of Biochemistry in Obstetrics and Gynecology at Harvard Medical School, said the radioimmunoassay is particularly valuable in coping with the large variable response in the population.

"With the assay," he said, "we can carefully track the progress of patients at risk for ectopics. By comparing the hCG levels of two blood samples taken 48 hours apart, we can obtain a clear picture of the hCG production rate and determine if this rate is consistent with an intrauterine or ectopic pregnancy."

The two to four hours required to process an hCG pregnancy assay contrasts sharply with two to three days needed earlier when testing involved the use of laboratory animals. Originally, doctors had to extract hCG from the urine of women believed pregnant and inject the hormone into the animals to see if ovulation occurred.

Produced by the tissue (chorion) surrounding the developing embryo, hCG is structurally so similar to other hormones produced by the pituitary gland (gonadotropins) and secreted into the blood that for years no good test existed to accurately measure hCG without substantial interference from the pituitary gonadotropin hormones.

Current state-of-the-art tests use hormone-specific antibodies and radioactive tracer substances to make them so sensitive and specific that only a region of the hCG hormone not found in other hormones can be searched for and measured. This unique area of the hormone is the so-called beta fragment, thus giving rise to the name of the test, the beta-hCG assay.

In addition to detecting pregnancy, the N.I.H. assay, now used worldwide, has proved useful in detecting certain types of tumors, such as testicular growths, which also produce hCG and in diagnosing certain intestinal disorders. ■

stress, will respond quickly to stress. Given the duties of a tibia, the fibula will remodel over time and actually grow to tibia size."

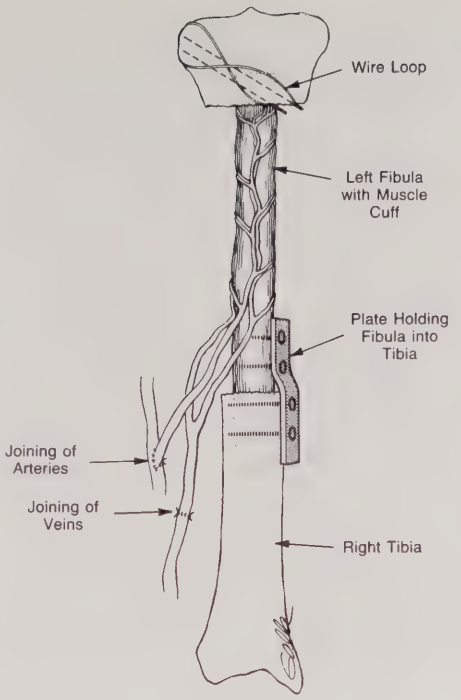
Connie need not be concerned about her left leg from which the portion of fibula was taken. The remaining lower segment of fibula has been screwed to that leg's tibia; thus the secondary bone section remains stable and in normal alignment. The lower portion continues to serve the ankle. As Connie's shinbone grows, so will the remaining fibula. The gap need not be filled.

Transferring healthy blood vessels to support the fibula graft in the right leg involved the use of operating microscopes.

Dr. Donelan, who is also Instructor in Surgery at Harvard Medical School, said the vessels were as tiny as those leading to the child's fingers, "but since we deal with such veins and arteries all the time in doing replantations, we did not consider the work in the leg to be an insurmountable problem."

Connie does have a complication, however, that is often associated with her disease. Areas of her skin contain brown discolorations which could be evidence of neurofibromatosis, a condition in which cells in part of the central nervous system are disrupted (*MGH News,* October 1980). No one knows whether Connie's skin spots presage the full-blown illness itself.

Dr. Jupiter, an Assistant Professor of Orthopaedic Surgery at Harvard, said



How replacement bone filled new role

that in some children with pseudarthrosis a whole constellation of problems exists. Skin, nerves, spine, and many other bones may be involved, all of which lend support to the belief that the disease is basically some kind of abnormal proliferation of elements in soft tissue which then have an effect on bone.

In the past, he said, surgeons tended to delay operating until a pseudarthrosis patient was older than Connie, but they have since learned that it is possible to do a microvascular bone transfer in a patient even younger than she.

Dr. Jupiter said he was planning similar surgery at Shriners on an 11-year-old child who developed an upper arm bone (humerus) difficulty. Here, too, the doctor intended to employ a portion of fibula.

Dr. Donelan expected Connie to remain in a body cast for 8 to 12 weeks following her leg surgery, the time dependent on how well healing takes place.

"After that, we hope to put her into a long leg cast," he said, "and then gradually begin a weight bearing routine. Once she progresses to a walking cast, we plan to send her back to Cyprus to be followed by an orthopedic surgeon there."

A West Springfiield couple, Mr. and Mrs. George Christodoulous, keeps in daily touch with Connie and the personnel caring for her, both at the SBI in Boston and at the Shriners unit in Springfield where she also spends much time. The couple briefs the girl's parents weekly on her progress. A member of the Shriners, Mr. Christodoulous formally sponsored Connie's admission for medical care, which by tradition that organization provides free.

Dr. Donelan said the use of vascularized bone has greatly enhanced the success of MGH surgeons in correcting problems involving deformed or absent bone; so much so that "in the future, this technique should be used increasingly in many areas, perhaps even in the transfer of entire joints." ■

A Treatable Illness Resembling Senility

A 66-year-old woman entered the MGH after suffering almost complete loss of memory and the ability to perform duties she had once carried out routinely.

Seeking a consultation in the Memory Disorders Unit, the patient's family feared she had Alzheimer's disease, a still unexplained disorder of nerve cells in the brain which has affected people as young as the early 40s (*MGH News,* December 1980 and September 1983).

The unit's director, Dr. John H. Growdon, ordered a CT (computerized tomography) brain scan. After close examination of the results, the MGH neurologist leaned toward a different diagnosis.

There were signs, he explained, that the disorder was not Alzheimer's but one often confused with it. Unlike Alzheimer's, for which no cure has been found, the other condition, called normal pressure hydrocephalus (NPH), may respond dramatically to treatment.

The CT scan revealed swollen chambers (ventricles) in the brain, a hallmark of NPH but also a common characteristic of Alzheimer's. However, surrounding brain tissue exhibited little wasting (atrophy), and this further pointed to a diagnosis of NPH.

Dr. Growdon referred his patient to the Neurosurgical Service. After additional tests, neurosurgeons installed a shunt, a tube through which excess cerebrospinal fluid (CSF) drained from the ventricles and dissipated in the abdominal cavity.

During her hospitalization and a brief stay in a nursing home, the woman regained her mental faculties sufficiently to return to her own home and once again care for herself.

Doctors believe that some years earlier she apparently suffered bleeding between two of the three membranes which cover the brain (a subarachnoid hemorrhage) and that this blocked pathways for normal CSF drainage. Such a hemorrhage is a known cause of NPH.

In a talk last fall to colleagues attending the 34th annual convention of the Congress of Neurological Surgeons in New York, Dr. Peter M. Black of the MGH said studies have shown that about six percent of people suffering from mental deterioration can benefit from a CSF shunt.

Hydrocephalus is defined as an abnormal accumulation of fluid in the cerebral ventricles causing compression of the brain. It is this compression which produces the same symptoms of senility seen in Alzheimer's and which the two-hour shunt procedure is intended to relieve.

"Normal pressure" in the disorder's name simply means that since the ventricles have enlarged they can accommodate a greater quantity of fluid, and therefore pressure tests will not detect anything out of the ordinary.

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Shunt May Reverse Some Mental Losses

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In contrast to NPH, in Alzheimer's disease (named after a German physician who first described the illness in 1907), fibrous material accumulates abnormally in the brain's nerve cells, destroying them and causing the brain to shrink. This constriction creates space into which the ventricles can expand.

A landmark paper, published in the *New England Journal of Medicine* in 1965, provided some of the earliest data on NPH and termed it even then as a treatable syndrome.

Authored by Drs. Raymond D. Adams, C. Miller Fisher, Robert G. Ojemann, and William H. Sweet, all at the MGH, and Dr. Salomon Hakim of Bogota, Colombia, the article said:

"Recognition and treatment of these cases is of great importance since it will result in what amounts to a 'cure' of a clinical condition that closely resembles presenile or senile dementia" (conditions today often recognized as Alzheimer's disease).

Lay observers sometimes describe NPH as "water on the brain." Actually, cerebrospinal fluid—which cushions the brain—is more than 99 percent water. CSF also contains elements such as sodium and potassium as well as other substances which may carry important instructions from one part of the brain to another.

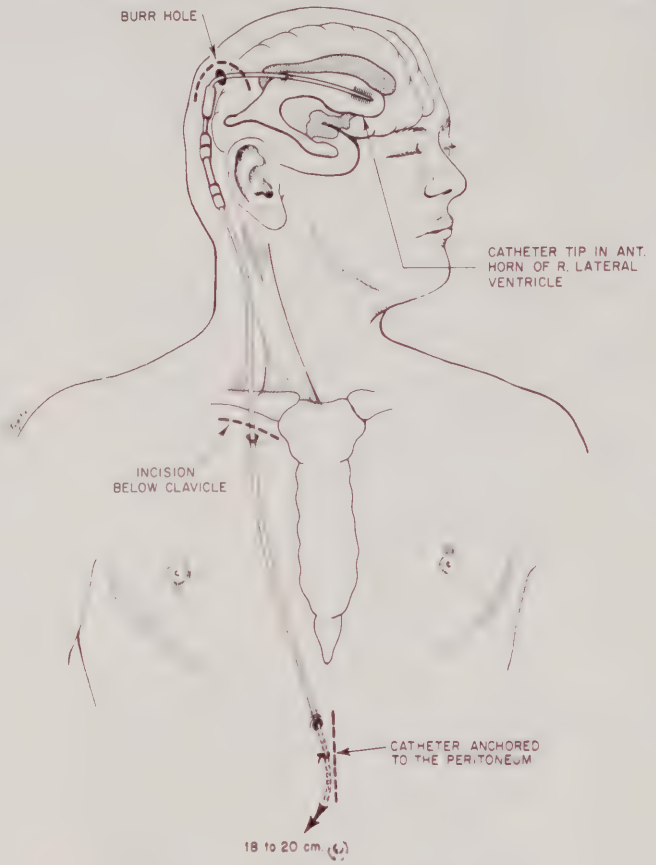
Even with computerized tomography, available since the early 1970s, diagnosticians often find it difficult to clearly distinguish between Alzheimer's and NPH. Frequently, no history exists of an earlier brain illness or injury which might facilitate a judgment.

In addition to CT, the diagnosis relies heavily on a study of the patient's symptoms and their severity.

"Each condition has the same kind of memory trouble, but in Alzheimer's the inability to remember is greater," Dr. Black said. "Speech problems, seizures, or a complete deterioration in the whole personality would also point toward Alzheimer's.

"On the other hand, walking difficulties seem to be more evident in normal pressure hydrocephalus. We look for gait problems as a prominent part of an NPH picture, accompanied by memory loss and inability to control the bladder or bowel."

In an article published in the *Journal of Neurosurgery,* Dr. Black reported that of 62 patients given shunts for normal pressure hydrocephalus of unknown origin, the triad of gait disorders, memory difficulties, and urinary incontinence proved to be the best clinical predictor of a good response. Of 31 patients with this combination of symptoms, 19 (61.2 percent) improved with a shunt.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CATHETER ANCHORED TO THE PERITONEUM
18 to 20 cm

Draining excess spinal fluid from the brain

The journal article also said that in a similar study, conducted by the Mayo Clinic, 74 percent of 19 patients with the same triad of symptoms showed gains.

Dr. Black emphasized that in judging whether a shunt would be beneficial the length of time that a patient has experienced mental reverses also must be considered. "Some people with longstanding illness will not improve after shunting," he said.

Dr. Ojemann, one of the pioneers in NPH research, said a few patients actually develop a combination of normal pressure hydrocephalus and Alzheimer's disease. In such situations, the MGH neurosurgeon has found that a shunt may help initially, but the Alzheimer's progresses and often eventually negates the benefits of the shunt.

Dr. Ojemann, who is also Professor of Surgery at Harvard Medical School, stressed the importance of screening candidates very carefully. "We obviously do not want to shunt people for whom there would be no benefit and where a number of complications could arise."

Withdrawal of too much fluid poses one major risk after installation of a shunt. When this happens, spaces in the center of the brain collapse and fluid subsequently collects over the brain. If neglected, the condition could become life-threatening. A CT scan would reveal the problem.

If too little CSF is shunted away, the enlarged ventricles might not become smaller; thus the procedure would have achieved nothing.

One thinks of normal CSF pressure in the brain as 180 millimeters of water. That is equivalent to about 12 or 13 millimeters of mercury. Since normal systolic blood pressure (the force that blood exerts against the walls of arteries as the heart pumps) is calculated as being about 120 millimeters of mercury, the CSF pressure in the brain could be thought of as about one-tenth of that.

In his MGH laboratory, Dr. Black, who is Associate Professor of Surgery at Harvard Medical School, is studying ways of measuring the absorption rate of CSF by brain tissue. From such data he hopes a more reliable diagnostic test for NPH may evolve.

Dr. Ojemann said other investigators are studying the reaction of blood flow when surgeons perform a spinal tap to remove samples of CSF from a patient. The researchers want to know whether changes, or lack of changes, in the flow correlate with the later results of shunting. If so, such a test could help in the selection of candidates for the operation.

Dr. Ojemann added that efforts are under way to learn whether two of the newer methods of evaluating the inner workings of the body can contribute to a more definite diagnosis of Alzheimer's and NPH. But he stressed that investigators need much more study of magnetic resonance imaging and positron emission tomography before determining the value of this potential use of the tests. ■

Psychiatrists Reflect On a Half Century Of MGH Service

The mind and body are so intricately intertwined that an assault on one will affect the other.

The late Dr. Stanley E. Cobb, one of Harvard Medical School's "great men of medicine" and the first Chief of the Massachusetts General Hospital (MGH) Psychiatry Service, put it this way: "Whenever the brain functions, there is organic change. The brain is the organ of the mind. Therefore, all function is organic, and mind and body are one."

Medical science, however, often separated medicine and psychiatry, and so they took different paths.

In an effort to bring psychiatry into the general hospital (where many felt was its rightful place) the MGH, with a grant from the Rockefeller Foundation, established in 1934 a department of psychiatry within the hospital. It was one of the first such departments in the scientific mold—having strong teaching and research components, as well as patient care.

Psychiatry had previously existed in a limited fashion as part of the MGH's neurology department. Founded by Dr. James Jackson Putnam and his colleagues in 1873, the Neurology Service maintained an excellent outpatient clinic and later a neurology ward and a consultation service that became internationally renowned.

The department was one of the first to apply psychiatry to mental symptoms in patients not sick enough to be confined to mental asylums but too sick to lead normal lives, sufferers of paralysis, headaches, melancholia, alcoholism, syphilis, and other such illnesses.

"Asylums had their place," said Dr. Thomas P. Hackett, present Chief of the MGH Psychiatry Service. "But they tended to isolate the patients and their doctors from medicine and the rigors of medical life."

The psychiatry department's opening fulfilled the precepts of the MGH's original charter, written in 1811, which asked the citizens of Boston to establish a place not only for the physically ill but also "for such as the wisdom of Providence has seen fit to visit with the most terrible of all human maladies—a deprivation of reason." From this latter goal arose McLean Hospital, owned now by the Massachusetts General Hospital Corporation.

Dr. Thomas P. Hackett, MGH Chief of Psychiatry, at a reception commemorating the department's 50th anniversary

Psychiatry's place among the MGH's medical departments themselves was solidified in large part because of Dr. Cobb, a prominent MGH neurologist and well-respected physician.

"Dr. Cobb was trusted by the medical community, was a member of the 'medical family,' and therefore stood on equal ground with other department chiefs," said Dr. Hackett. "He fashioned the psychiatry department to fit into the general hospital setting."

Following the MGH lead, psychiatric units modeled on the MGH's department began to spring up in general hospitals all over the country.

"In fact," said Dr. Hackett, "the focus of attention in psychiatry has so shifted from the asylum to the general hospital that, I believe, this decade will be referred to as 'the decade of general hospital psychiatry.'"

From the department's beginnings in the general hospital, Dr. Cobb established a strong interest in the interrelationship of the emotions and physical illness. The notion of psychosomatic illness had been a European belief for centuries. However, the idea that emotions could cause certain physical illnesses was slow to gain acceptance in the U.S. Stanley Cobb was one of the first in this country to apply talk therapy (psychoanalysis) to physical illness.

In fact, the MGH Psychiatry Service played a major role in launching psychoanalysis in the U.S. In the 1930s, Dr. Cobb welcomed to Boston many psychoanalysts who were fleeing Hitler and Nazism in Europe. They were a distinguished group and included many who had trained under or worked for Freud, such as Hanss Sachs, Erik Eriksen, Grete and Edward Bibring, and Felix and Helena Deutsch. At Dr. Cobb's urging, these psychoanalysts joined the MGH staff.

The department's work with psychosomatic illness has linked medicine and psychiatry and resulted, among other things, in the development of the Psychiatry Consultation Service.

Serving most often the needs of those suffering from neuroses and anxieties rather than psychoses, the 50-year-old MGH Psychiatry Service has been primarily an outpatient practice (though inpatient beds have existed since the department's beginnings).

The Consultation Service, however, established by Senior Psychiatrist Dr. Avery D. Weisman, with Dr. Hackett as his first resident, proved the invaluable position of psychiatry within the hospital setting. One of the first to furnish consultation to medical and surgical patients, the MGH Consultation Service also became a model for hospitals throughout the country.

Today, psychiatrists in the Consultation Service, which has grown to 20 members, help patients to accept the diagnosis of cancer, to adapt to diabetes, ulcerative colitis, and hypertension. Drs. Hackett and Ned H. Cassem performed much of the early research regarding reactions of patients with coronary artery disease and others confined to intensive care units.

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Ambulatory Care Trend Suits Psychiatry

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The Consultation Service has attracted many physicians who, like Dr. Hackett, were undecided whether their hearts were in medicine or psychiatry. "I found in the service an ideal solution," said Dr. Hackett, who is also Eben Draper Professor of Psychiatry at Harvard Medical School. "Although based in psychiatry, we have enough involvement in medicine so that our interest in the biological side of psychiatry is satisfied."

Dr. Erich Lindemann, who became the second Chief of the Psychiatry Service when Dr. Cobb retired in 1954, de-emphasized psychosomatic illness. He believed such illness to be more often the result of stressful changes in the social environment.

His early research centered on the families of victims of the Cocoanut Grove fire, a devastating blaze that in 1942 gutted the famed Boston nightclub, killing 491 people and injuring hundreds more. His classic paper on the nature and management of grief alerted psychiatrists and other physicians to illnesses caused by an inability to grieve or by a denial of death.

Dr. Lindemann's interest in the patient's social environment led to his pioneering work in the community mental health movement in the 1960s. "He believed that the psychiatric patients he saw in the hospital didn't tell the whole story," said Dr. Avery Weisman. "It was essential to understand the family unit, the community, and the subculture as a backdrop for the patient's illness."

Neighborhood centers, which employ psychiatrists, social workers, and others familiar with the patient's physical and human environment, Dr. Lindemann felt, often provide more effective care than the large hospital setting.

Advances in psychopharmacology (drug therapy) in the 1950s and 1960s, to which the MGH contributed much, made it possible for many patients to leave asylums and seek care in general hospital psychiatric units and community mental health centers.

"There is no question that a shift exists in medicine toward outpatient or ambulatory care," said Dr. Hackett, who in 1974 succeeded Dr. Leon Eisenberg as department chairman. "This will be reflected strongly in psychiatry. Diagnostic and therapeutic facilities will all be directed to this end. Since general hospital psychiatry already depends heavily upon its outpatient contingent, we are ideally suited to accommodate this shift."

The department celebrated its 50th anniversary last fall by two days of formal presentations and an evening of festivities. Several hundred present and former residents and others associated with the Psychiatry Service through the years attended the colloquiums, which reviewed a half-century of activities at the MGH and of psychiatry in general. Dr. Hackett was the keynote speaker.

"In reviewing the past 50 years, I am surprised to find how little has changed in the way the psychiatrist's professional time is spent, despite the immense changes in the science of psychiatry," he said.

"Even with our highly effective drugs and diagnostic techniques, our main job as psychiatrists is to listen, to gather and sort the facts, and to synthesize and dispense advice through insight."

Dr. Hackett stated that though the department has grown tremendously—from 13 original members to nearly 300 today—the philosophy has remained consistent with Dr. Cobb's conviction: "to put our principal resources and efforts into activities which are most important to the general hospital." ■

Following retirement, Dr. Stanley Cobb, first MGH Chief of Psychiatry, devoted considerable time to studying the brains of birds. He hoped to learn how they acquired their homing instinct.

MGH News

MASSACHUSETTS GENERAL HOSPITAL, BOSTON, MASSACHUSETTS Vol. 44 No. 4 May, 1985

Laser's Beam Eases an Ordeal Caused by Cancer

When the patient entered the MGH Endoscopy Unit, his esophagus, or food pipe, was so blocked by cancer he could not even swallow his saliva.

Earlier, doctors had implanted a plastic tube in his esophagus to try to maintain an open passage for food, but the cancer just grew over the device.

At the MGH, the patient underwent a newly offered treatment. Available on an ambulatory basis and given while he was fully awake, it took less than a half hour to administer.

Only a day after being unable to swallow even his saliva, the man, in his mid-60s, sat down at a table in his home and eagerly consumed a large bowl of thick soup.

The success of his treatment resulted from combined use of two high technology instruments: an endoscope, a specially lighted viewing device which was extended through the patient's mouth into his esophagus, and a so-called neodymium YAG laser, whose powerful beam traveled through the endoscope and

(Continued on Page 2)

MGH Support Group Helps Young Patients Cope With Problems

For the very sick or injured, the road back to good health can be both a long and a lonely one.

No one feels this impact more than the teen-ager. The changing needs of youngsters on the brink of adulthood may already extend beyond the capabilities of parents to fulfill.

For most adolescents separation from peer groups, in and out of school, eliminates a major source of comfort and reassurance to deal with a host of issues that can arise from being hospitalized, sometimes for periods of many weeks.

Recognizing this, three years ago this month two staff nurses in the MGH Children's Service—Ann Kushner Gerberg, RN, and Kathryn Pazola, RN—organized an Adolescent Support Group on Burnham-4, the hospital's floor for adolescent patients.

The efforts of these nurses received strong encouragement from the Burnham-4 nursing staff; Julie Charbonneau, RN, Head Nurse; and Anne H. Sheetz, RN, Pediatric Nursing Chairman.

Each Tuesday afternoon at one o'clock, patients between 13 and 19 years old gather in a recreation room and for an hour discuss a variety of topics. Working under a volunteer, six-month rotation plan, two staff nurses serve as group leaders for each session.

After each meeting, the nurses confer with Rosalie A. Tyrrell, RN, a psychiatric clinical nurse specialist, who has worked with the support group since its inception. They discuss what happened at the latest get-together, including interactions that may have raised questions in the minds of the nurses themselves.

"I offer the leaders options on how to intervene in particular situations," Miss Tyrrell said. "For example, how does one deal with a young patient whose behavior disrupts a meeting? Or conversely, the teen-ager who just sits back and says

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Fifteen-year-old Phil Bernstein finds that his participation in the MGH Adolescent Support Group helps to keep his spirits up.

Repairing the Heart In an Unusual Way

The strategy initially seems difficult to fathom. A potentially fatal heart condition being treated by provoking the symptoms to recur.

Yet, a team of highly trained MGH cardiologists does just that to initiate care for people with arrhythmias—electrical malfunctions of the heart which trigger irregular or abnormally fast heartbeats.

Each year arrhythmias claim a half million lives in the United States, about one each minute.

In explaining why his team reproduces these heart problems, Dr. Jeremy N. Ruskin, Director of the Arrhythmia Service in the MGH Cardiac Unit, said that

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EDITORIAL:

Youth . . . An Over-Praised Season

To me it seems that youth is like spring, an over-praised season—delightful if it happens to be a favored one, but in practice very rarely favored and more remarkable, as a general rule, for biting east winds than genial breezes. (Samuel Butler: *The Way of All Flesh*)

Samuel Butler also said that "growing is not the easy, plain sailing business that it is commonly supposed to be." Butler was right on both counts. The adolescent years especially are neither as pleasant nor as easy as commonly conceived. Whether an occasional pimple on the end of the nose or a constant riot of red, acne is not much fun. Neither is the agony of asking the secret object of your daydreams to be your first date. Or trying to place in perspective the often cruel comments that your equally immature classmates make. Or deciding on a career. Or whether to go to college. Or facing the rigors of serious study. Or balancing books and athletics. Or mastering an awkward voice or an equally awkward gait. Or experimenting with sex, drugs, alcohol, and tobacco. Or learning to drive safely—or to avoid dares to speed.

In short, adolescence is tough enough *without* getting sick. Children's Service nurses from the MGH floor for adolescents were all too aware of this when they formed a support group for their emerging adults. The forum the nurses have been providing has met the challenge. Youths, some shy and introverted, others confused and even frightened, have learned to communicate among themselves and with their caretakers. The adolescents have met new friends in their peer groups and learned to share their problems. At the same time they have found better ways to adjust to problems that have arisen from illness and hospitalization.

The nurses who organized the support group are carrying out a tradition. As their colleagues in other sections of the MGH Children's Service have so often done, they perceived a need. That the need extended beyond their regular duties challenged rather than fazed them. For the last three years the adolescent patients of the hospital have reaped the reward.

YAG Laser

(Continued from Page 1)

vaporized the cancerous tissue.

Dr. James M. Richter, Chief of the MGH Gastrointestinal Clinic, emphasized that the treatment does not lead to a cure since the tumor, usually a squamous cell carcinoma, almost always regrows.

"Although the laser can be used repeatedly," he said, "the tumor grows not only into the esophagus but also in the other direction, right into the chest."

In the past, many patients with an esophagus blocked by cancer have died within six months, not from the tumor, but from the effects of malnutrition.

"We're simply buying more time for the patient," Dr. Richter said. "Our goal is to improve nutrition and quality of life."

The average patient might require between four and six treatments for the coring out of more and more cancer, but so long as the individual can take adequate nourishment at home, expensive hospitalization is generally avoided.

At other hospitals, an esophageal cancer patient might have to be an inpatient for periods ranging from three days to three weeks, depending on the length of the treatment program.

Various lasers can be utilized in conjunction with an endoscope, one being the argon laser commonly employed by ophthalmologists to treat eyes. But in addition to being a high-energy instrument, the YAG is a compact machine (a little over four feet high and less than two feet wide). It can easily be wheeled about and installed. In contrast, the argon needs a room of its own.

The fourth most common cancer of the digestive tract, carcinoma of the esophagus strikes an estimated 20,000 Americans yearly, and about 90 percent of them eventually succumb to the disease. Surgery for the condition carries a 5 to 10 percent mortality risk and usually requires a costly month in the hospital.

Called neodymium YAG because the active ingredient is the rare element neodymium laced into "yttrium aluminum garnet," an artificial diamond, this laser also is employed through the endoscope

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Photographs: Pages 1, 3 (upper), 4, 5 (lower), 6, Myron Daniels; p. 3 (lower), courtesy of Dr. James Richter; p. 5 (upper), courtesy of Dr. Richard Liberthson; p. 7 (upper), courtesy of Federal Drug Enforcement Administration; p. 7 (lower), courtesy of Marissa Seligman; p. 8, courtesy of the Governor's Alliance Against Drugs

Dr. James Richter demonstrates use of the neodymium YAG laser with an endoscope to attack disease in the esophagus.

to treat bleeding ulcers, usually situated in the stomach but sometimes in the duodenum, the first portion of the small intestine.

A major feature of the YAG is the ready absorption of its rays by substances that are red. Since blood is red, the laser has proved to be particularly effective in coagulating blood.

Unlike outpatient care for esophageal cancer, laser treatment for bleeding ulcers must be given on an inpatient basis. Although only a single exposure to the laser beam might stop the bleeding, the patient must be observed closely for up to seven days in the hospital to guard against any recurrence of the problem.

Even though relatively new in the United States (in New England, only four centers have the device), the YAG laser has been used in Europe to treat some two thousand bleeding ulcer patients.

Since its introduction in this country, physicians have applied the device increasingly to the elimination of cancers in both the esophagus and the bronchi (tubes leading from the windpipe to the lungs).

The YAG laser accomplishes what electric cautery does through an endoscope, but in the hands of a trained specialist the laser functions with greater ease and safety.

"With electric cautery, one has to touch the tissue," Dr. Richter said. "Through the endoscope, the doctor has tunnel vision but no depth perception so the cauterization process is technically difficult to control."

In contrast, the physician aims the invisible beam of the YAG laser with a second extremely low-powered device called a helium-neon laser which produces a red light, like that of a neon bulb. By focusing that beam along the same pathway as the YAG, the doctor knows that his more powerful beam is also in focus.

The YAG thereupon simply shines a ray of infrared energy for one-half to one second. In treating a bleeding ulcer, the beam first heats and coagulates protein in the target tissue, then shrinks the tissue as water in it evaporates. For a cancer, the procedure goes a step beyond cauterization to vaporization.

Despite a protective tube placed in a patient's esophagus, special X ray shows how cancer (see arrows) grew over the device and narrowed the food passage.

YAG is one of the most powerful lasers used in patient care. The specialist determines before treatment the approximate strength of the tissue to be attacked and programs his machine to deliver a specified amount of energy for a specified amount of time.

In an adult, the inner diameter of a healthy esophagus usually measures an inch or an inch and a half. When cancer develops in the tube and concentrically narrows the diameter to a half inch or less, a major blockage has occurred. "That's when things really back up," as Dr. Richter put it.

In the MGH Endoscopy Unit, the patient to be treated, whether for cancer or a bleeding ulcer, must have abstained from food or drink for at least 12 hours. Most of the cancer patients are on purely liquid diets.

The patients receive the same sedation as is given for traditional endoscopic procedures. That means a numbing of the back of the throat with one drug and giving another intravenously to calm the person.

"The cancer patients can have liquids again starting three hours after the laser treatment," said Dr. Richter, who also serves on the faculty of Harvard Medical School. "We usually prescribe high calorie, high protein supplements because of concern over nutrition. It's only later that we try to give solids."

He explained that even if the esophagus had been relatively opened, a solid food, taken prematurely, might plug the tube and for a while render the patient incapable of swallowing any nourishment.

Barring complications, an employed individual who receives ambulatory YAG laser treatment can return to his job the next day. Many of the patients are too ill to hold jobs.

Of those patients treated since the YAG service began at the MGH about four months ago, the ones with bleeding ulcers were in their 50s and the patients with cancer were in their 60s and 70s.

"At the current rate," Dr. Richter said, "we will treat about 25 patients the first year. The number may reach 100 annually in a couple of years."

The MGH is also considering extending its application of the YAG laser to treating certain lung disorders and even to use in neurosurgical procedures where two sets of lasers, a cutting CO2 laser and a coagulating YAG laser, would be a distinct advantage. ■

Studies of Abnormal Heartbeats Facilitate Treatment Planning

(Continued from Page 1)

such patients simply "do not respond uniformly to antiarrhythmic drugs.

"The techniques we use in our Cardiac Electrophysiology Laboratory provide a way of assessing in each individual what a given drug is doing; whether it is helping to prevent the arrhythmia, is having no effect, or is actually making the condition worse."

Dr. Ruskin said that arrhythmias generated in the laboratory can be reversed in the vast majority of patients within seconds of their onset. In rare situations, multiple attempts are required.

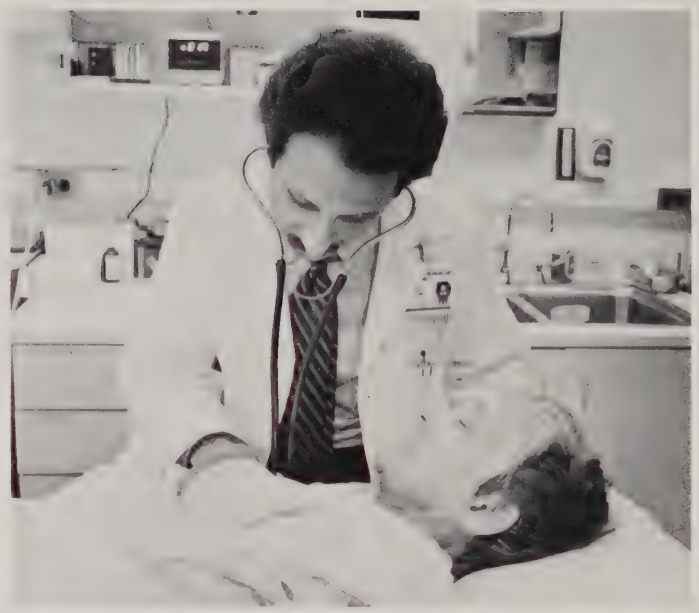
Since Dr. Ruskin introduced the technique at the MGH in 1976 after being trained by its developer, Dr. Anthony Damato, at the U.S. Public Health Service Hospital in Staten Island, N.Y., more than 4,000 procedures have been performed in the Electrophysiology Laboratory, many on critically ill patients.

One person died, an 80-year-old man whose three major coronary arteries were found to be blocked. He had been resuscitated after a cardiac arrest only a few days earlier. Of all the other patients treated in the lab, no disabilities resulted.

The laboratory staff employs either one of two methods to stop an arrhythmia.

Through electrical stimulation the team can speed up the heart to an even faster pace than its abnormally rapid beat, known as tachycardia. In most patients, this "overdriving" technique restores a normal sinus rhythm.

Dr. Michael Davis begins feeding thin tubes (catheters) through the patient's veins to her heart.



Dr. Jeremy Ruskin examines a patient in the Electrophysiology Laboratory prior to the start of a study of irregular heartbeats (arrhythmias).

The second corrective measure, called cardioversion, involves use of an external device to deliver an electric shock to the heart. This also allows a normal rhythm to once again take control.

The electrophysiology studies do present one element of risk for the patient. To pace the heart and record its electrical activity, the cardiologist must feed several tubes (catheters) through veins into various parts of the heart. Whether to deal with arrhythmias or any other physical problem, catheterization poses a less than one percent risk of complications, such as bleeding.

The catheters seldom cause any discomfort to the patients who range in age from 4 to 75. The heart and blood vessels are insensitive to the touch of the tubing.

Major hospitals throughout the country have established similar laboratories, and the technology has spawned a wealth of new therapeutic tools.

"While drugs are still the mainstay in treating arrhythmias," Dr. Ruskin said, "there are many patients in whom drugs don't work or who have difficulty tolerating their side effects. For such patients, the new devices can be very useful."

Antitachycardia pacing techniques have led to new kinds of implantable pacemakers. They interrupt excessively fast heart rhythms by delivering rapid bursts of electrical impulses. In contrast, the more familiar pacemakers are designed to prevent excessive slowing of a heart.

The MGH is one of a few centers implanting another device called a cardioverter defibrillator. Developed at Johns Hopkins Hospital, this instrument continuously monitors the electrical activity of the heart's pumping chambers (ventricles). When the rhythm becomes disturbed, the device automatically delivers a normalizing countershock.

"Although still investigational, the defibrillator has saved a significant number of lives," Dr. Ruskin said.

A new technique uses catheters as a therapeutic tool. In carefully selected patients with tachycardia, physicians are now able to map the problem area and then deliver an electrical charge through the tip of a catheter to destroy a small area of tissue and in some patients avoid a surgical procedure.

While the technique, called transcatheter electrical ablation, leaves some scarring, the area treated is miniscule in relation to the overall muscle mass and has no impact whatever on the mechanical function of the heart.

"The MGH was among the first three centers to use this treatment for arrhythmias," said Dr. Ruskin, who is also Associate Professor of Medicine at Harvard Medical School. "We now have more experience with this investigational technique for the treatment of ventricular tachycardia than any other hospital in the country."

Extreme cold has begun to figure in the treatment of another heart irregularity. Doctors estimate that one of every one thousand people is born with an extra pathway for electrical signals sent from the upper chambers of the heart (the atria) to regulate the lower chambers (ventricles). The condition is called the Wolff-Parkinson-White syndrome (the last name being that of the late MGH cardiol-

A Closer Look at Children's Arrhythmias

On an average day at the MGH, Dr. Richard R. Liberthson sees several children confirmed by electrocardiograms as having suffered an arrhythmia.

During the past 15 years, the adult and pediatric cardiologist has devoted considerable attention to arrhythmias in the young, particularly rapid and/or irregular heartbeats which have led to a temporary heart stoppage.

"Since cardiac arrest in this population is not all that common, most physicians have little experience with the event and tend to refer such patients to major centers," Dr. Liberthson said.

"At the MGH, we have had arrhythmic patients referred to us in large enough numbers that their problems are becoming better defined. We're continually learning more and more in identifying a specific disorder, determining its appropriate management, and delineating the outcome."

In devising a treatment for such patients, Dr. Liberthson, who is also Associate Professor of Pediatrics at Harvard Medical School, often collaborates closely with the MGH's Cardiac Electrophysiology Laboratory.

Even after surgery for some other heart condition, he said, several types of patients have been found at risk for arrhythmias.

"Although the patient is considered well after the operation, an arrhythmia may develop months, even years, later," he said.

Now well, Gregg Morava, 17, of Andover, Mass., a nationally ranked schoolboy swimmer, was treated at the MGH for marked arrhythmias only a few years ago.

Life-threatening arrhythmias interrupt the heart's ability to pump the amount of blood needed by the body for normal functioning. On the other hand, some arrhythmias, capable of worrying the patient, may be minor.

"Generally these are the isolated extra single beats from the lower heart chambers, the so-called PVCs [premature ventricular contractions]," Dr. Liberthson said. "They provoke anxiety, but in the normal heart they are, by and large, harmless."

He emphasized the importance of reassuring the parents of children with such a condition. Over five to eight years the PVCs in more than half of those youngsters will disappear.

A condition often experienced as a palpitation or fluttering of the chest also tends to be mild and self-limited but can be dangerous if prolonged. Paroxysmal atrial tachycardia (PAT) is characterized by the abrupt onset of a fast heartbeat, then a sudden slowing, as if someone were shifting the gears of a car. In abnormal hearts and in small babies, if the condition continues for many hours, it can cause heart weakening, even cardiac arrest.

The experience and even the family history of arrhythmic youngsters often help to identify the conditions that may accompany the disordered heartbeats.

"Children who complain of fainting must be evaluated closely because that population presents a high number of arrhythmias," Dr. Liberthson said. "Dizziness accompanied by palpitations, especially during exertion, should also be looked at.

"But having an arrhythmia does not mean the patient is a sudden death risk. Often a good evaluation just clears the air and relieves the patient." ■

ogist Dr. Paul Dudley White).

The syndrome can lead to very rapid, uncomfortable, and sometimes life-threatening arrhythmias. Dr. Ruskin explained, however, that "these abnormal electrical pathways can now be localized by special mapping techniques in the Electrophysiology Lab and in the operating room. A surgeon can freeze them, working from the outer surface of the heart.

"The fact that the heart does not have to be opened makes this approach faster and safer for the patient."

The team which performs this specialized surgery at the MGH is comprised of Drs. Mortimer J. Buckley, Jr.; Marshall Jacobs, and Gus J. Vlahakes. They work closely with Drs. Ruskin, Hasan Garan, who has codirected the Electrophysiology Lab since 1978; and Brian A. McGovern in the care of these patients.

The procedure, called cryosurgical ablation, involves freezing the abnormal pathway at minus-60 degrees centigrade. At that level of cold, tissue dies and forms a sharply demarcated scar which is electrically silent and, therefore, cannot give rise to an arrhythmia.

Adolescents or young adults are the likeliest candidates for the cryosurgery because the congenital condition often becomes symptomatic in that age range.

In addition to patients with the Wolff-Parkinson-White syndrome, the Electrophysiology Lab also works with a group of young people who have suffered serious arrhythmias of their lower heart chambers without having any obvious underlying heart disease.

"These are individuals who have suffered a sudden out-of-hospital cardiac arrest and been resuscitated," Dr. Ruskin said. "We perform electrophysiology techniques in these patients to assess their heart rhythm and settle on a drug regimen which hopefully will prevent recurrence of the arrhythmias." ■

Using special equipment, Dr. Edward Walsh, left, and Dr. Davis reproduce and record the patient's heart rhythm disturbance to guide treatment.

Young Patients Discuss Mutual Concerns

(Concluded from Page 1)

nothing?"

The group leaders maintain a log acquainting other nurses with the general issues taken up at the latest session and how they were handled. The log is confidential to maintain patient privacy.

The nursing staff is acutely aware that in a hospital patients cannot choose peers to be with. They associate with whoever also happens to be an inpatient.

"There may be conflicting social, cultural, and economic values," Miss Tyrrell said, "but coming together in a group helps the patients realize that they have mutual concerns and that they are not alone."

Through group participation, under guidance of the nurses, the patients learn to share, get reinforcement from each other, and develop positive ways to problem-solve.

The issues that the patients bring up take many forms: foreboding about loss of health and what the future holds, confusion over their care, the impact from the interruption of routine life, and the lack of privacy that one comes to expect as a budding adult.

But there are also less stressful subjects:

"Last week, we discussed amusement parks," said 15-year-old Philip Bernstein, an orthopedic patient from Nantasket, Mass., which boasted a popular amusement park for many years. "The kids talked about the different rides they liked.

"One of the kids also knew a lot about home computers. So we spent some time talking about that."

Another 15-year-old, Michele Piwowarski of Saugus, Mass., hospitalized with a kidney problem, said one gets lonely sometimes "but knowing the kids as a result of the meetings, you can hang around with them. Sometimes at eight o'clock at night, with the permission of the nurses, we'll go down to the coffee shop."

Seventeen-year-old Wendy Hunter of Fort Lauderdale, Fla., facing knee surgery, said the support group makes one realize that there are others on the floor who have problems as serious, if not more so, than one's own.

Miss Tyrrell told of a young man whose feelings about himself had hit rock bottom because of respiratory difficulties complicated by obesity. He had been hospitalized for about two months.

"He began to attend the group meetings but initially would remain only a few minutes," she recalled. "Although he knew he could leave at any time, he soon found himself staying longer and longer. After a while he took on a shared leadership role, urging others to attend.

"This helpful activity made the youth feel that he was doing something positive with his life. From the group he regained some of his self-esteem."

The group has firm ground rules. Do not interrupt when someone is speaking. Respect what others say. Do not discuss outside the meeting what was said in it unless the speaker gives permission.

On occasion, a patient's comments at a group session will lead to a meeting with the team involved in his care, e.g., his physician, nurse, social worker, and perhaps a number of medical consultants.

Mrs. Gerberg explained that at a group meeting the patient may have expressed deep frustration over receiving vague responses from his care givers to such questions as, 'Am I going to have surgery? Are my medicines going to be changed? When can I expect to go home?'

To a youngster trying to plan his life and have some control over it, the lack of knowledge can be difficult to bear.

The patients feel especially comfortable confiding in the nurses because, while physicians come and go, the nurses are visible around the clock. They are always available when the patient wants to talk.

"Sometimes that readiness to talk will come in the group situation where the patients are invited to say whatever is on their minds," Miss Pazola declared, "but it may also come at one o'clock in the morning when a patient signals for a drink of water or to have a pillow rearranged."

At times some teen-agers skip group meetings. Perhaps something had come up that touched a sore spot. They might feel they need a break. "We don't push them to attend," Mrs. Gerberg said. "They're stressed enough while they're here."

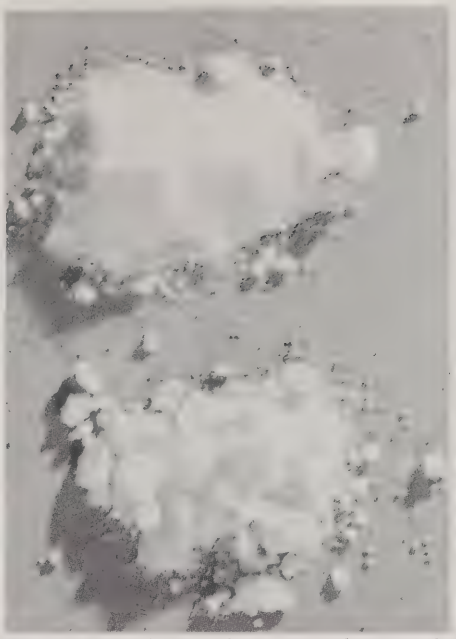
Parents are not allowed to attend the Adolescent Support Group meetings and sometimes may wonder why. Nurses explain the concept of the support group to parents.

"Parents must understand," Miss Pazola explained, "that their teen-aged child who only a short time ago wanted to confide in them has now reached an age where privacy is important. While still willing to talk, the adolescent prefers to share with others closer to his own age."

In general, the parents wholeheartedly endorse the support group, which will be described in greater detail in a forthcoming issue of the *Journal of Maternal-Child Nursing.*

Noting that their offspring have cultivated new acquaintances and interests, the fathers and mothers, who had been wrapped up in their child's problems, may now feel a greater freedom to finally turn to the needs of others in the family, including themselves. ■

Staff nurses Kathleen Benson, left, and Karen Johnson, fourth from left, supervise a weekly meeting of the MGH's Adolescent Support Group.



Left photo shows the coca plant from which cocaine is extracted. In right picture, the top pile of white crystalline powder is pure cocaine. Bottom pile is adulterated form of the drug.

The High Price of Getting a "High"

A man with a heart condition came to the MGH Emergency Ward (EW) recently and complained of chest pains.

As doctors examined him, the patient told them that the pains had occurred several times before and "always on a Saturday night."

Mystified, the physicians questioned their patient at length and finally elicited an explanation.

Oblivious to the danger, particularly to someone in his physical state, the man sought a "high" on weekends by "snorting" (inhaling) cocaine.

The drug stimulated his central nervous system and brought on the attacks of angina by elevating his blood pressure and accelerating his heart rate.

Ten years ago, the chief concern over so-called recreational drugs centered on the use of marijuana, especially in high school populations. Today, marijuana pales beside cocaine, whose users range from teen-agers to people of middle age, among them many professionals.

In lectures to a number of groups in recent months, Dr. Peter L. Gross, Associate Chief of Emergency Medical Services at the MGH, stressed the hazards of cocaine and other drugs. The period from March 17 to 23 was formally observed across the nation as Poison Prevention Week.

Dr. Gross said that although estimates of how many people in the United States use cocaine are probably not totally reliable, "there are some suggestions that those who use it on a now-and-again basis, once or twice a week, may number more than 20 million."

Since 1976, cocaine-related deaths and visits to hospital emergency rooms have increased more than 200 percent in this country.

A stimulant derived from the South American coca bush, cocaine produces euphoria, but the effect lasts only 20 to 30 minutes. Users therefore tend to take the drug in repeated doses; a "run," it is called.

When they finally stop, usually because they have exhausted their cocaine supply, the sought-after "high" turns into a "low" —depression, irritability, sleeplessness; the so-called cocaine "crash."

That often instigates a search for more of the drug. "The financial impact is colossal," Dr. Gross said. "A gram of cocaine, enough for four 'hits,' sells for $50 to $150."

Cocaine paraphernalia

To heighten their profit, dealers often adulterate the drug with simple sugars or other drugs. While the volume increases, the impact is diminished by the cut.

To increase potency, some addicts "free-base" their cocaine. This is a procedure which generates a chemical action making the drug stable at a high temperature and absorbable by the respiratory tract. Users then smoke the drug.

"The effect is almost equal to taking it intravenously, a route most users avoid because of a major risk of complications," Dr. Gross said.

If a user turned to free-basing in a mistaken belief that his cocaine had been adulterated, he could wind up with a much bigger kick than he bargained for.

Occasionally, personnel in the EW treat patients who have used cocaine combined with heroin, a "speedball."

"These individuals, however, are among the hard-core addicts," Dr. Gross said. "They are really not the type who use drugs for social diversion and show up voluntarily for the care of some problem related to such use."

The doctor warned that even a single snorting of cocaine can produce major health problems. Depending upon how much cocaine is in a prepared mixture, some people will experience quite an absorption through the nose and a seizure may result.

"Cocaine is becoming one of the more common causes of first-time seizures encountered in emergency rooms," Dr. Gross said. "Very often the patient or whoever accompanies the person to the hospital does not want to admit that cocaine was used. So the task of determining what led to the seizure is made that more difficult."

Chronic inhaling of cocaine can irritate the inside of the nose to such a degree that the wall separating the nostrils may perforate. Patients may seem intoxicated, disoriented, restless, in pain, and have a fever of 102° or 103°F.

The physician may summon a psychiatrist to treat those with severe depressive reactions. Antidepressant medications will sometimes help the individual to overcome the cocaine habit.

In the last year or two, health and law enforcement officials have also reported a sharp increase in the use of a drug combination called "Pacs" (short for packages).

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Overuse of Everyday Drugs Can Be Risky

(Concluded from Page 7)

Drug users have found that they can obtain a heroin-type kick by combining a sleep medication, glutethimide, with certain pain killers containing codeine.

Glutethimide was a favorite sleep aid some 15 years ago, but it had a high toxicity when taken in excess, particularly when mixed with alcohol. The drug's popularity waned as safer products became available.

"We've seen patients who used up to eight Pacs a day," said Dr. Gross, who is also Assistant Professor of Medicine at Harvard Medical School. "Even patients using smaller numbers are at substantial risk."

Part of the major health danger they face is from the ingestion of excessive amounts of aspirin and acetaminophen, the portion of the drug combination which has no role whatever in terms of providing a "high."

"Since last summer," Dr. Gross said, "two people have died here from liver or kidney failure as a consequence of injuries to those organs by the passive ingredients in Pacs. The victims were so out of it from the hypnotic effects of the other drugs they simply weren't able to realize the risks."

While in some areas of the country hospitals receive only a trickle of Pacs patients, in other areas the drug combination ranks second only to heroin in overdose deaths.

Another drug high on the danger list is PCP (phencyclidine), often called "angel dust." Developed as a surgical anesthetic for humans, phencyclidine had such unpleasant side effects, such as delirium, extreme excitement, and vision problems, it was soon restricted to veterinary use.

PCP is frequently added to cocaine mixtures that are snorted and to marijuana mixtures that are smoked because it will heighten the effect.

"The Emergency Department doesn't see as much PCP as in past years," Dr. Gross said, "but it's still one of the more common recreational drugs, particularly among teen-aged groups."

One of the difficulties in dealing with this drug is that its users can develop very aggressive behavior. "These people often have to be restrained and heavily sedated," the doctor said.

In California, police have recorded a number of homicides and suicides involving individuals who were under the influence of PCP.

Although drug abuse patients account for only a handful of the more than 200 people treated daily in the MGH Emergency Ward, the drugs involved vary widely and often have such serious consequences that hospitalization is required.

In a study of some 200 drug overdose patients treated in the EW between October and December of last year, the most common agents used included a mixture of alcohol and diazepam, one of today's most prescribed antianxiety medications; antidepressant drugs, and barbiturates (sedatives).

"In general, diazepam is a safe agent," Dr. Gross said, "but combined with alcohol it can make a person sick enough to need treatment with a respirator in an intensive care unit."

In dealing with drug abuse patients, the MGH Emergency Ward frequently utilizes the consultation services of the Massachusetts Poison Control Center, situated at Boston's Children's Hospital.

The center also responds to inquiries from the general public on accidental poisonings. The center's phone number for residents of Greater Boston is **232-2120.** Residents outside that area can call, toll free, **1-800-682-9211.** ■

Governor Michael S. Dukakis kicks off his Drug Busters' program at an elementary school in Boston's Jamaica Plain district. The program is designed to alert grade school children to the hazards of drug abuse.

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Lessening Children's Fears of Ambulatory Surgery

A Salute to the General and Its Staff

[Editor's Note]—*The following article was written by award-winning author James Carroll, a former priest and until 1974 a chaplain at Boston University. The story appeared in the April 1985 issue of the literary magazine, the Boston Observer, and is reprinted with permission.*

Because I was a chaplain, the mad girl's roommate came running to me. "She claims she's the Virgin Mary," the roommate said. "She's wrapped herself in sheets and is acting really weird."

I went immediately to the girl's room in the high-rise BU dormitory. And there she was, ensconced on a throne of pillows in the corner of her bed, a pretty blonde freshman draped, sure enough, in a white sheet, but looking more like Venus than any Saint Mary I knew of. "Only white," she said when I asked, "because white is the color of purity."

I was no psychiatrist, but it was quickly obvious that the girl was in the middle of what I think they call a schizophrenic episode. She needed help and fast. I convinced her to come with me, but she refused to wear anything but her pristine linen. It was winter, and so I wrapped her in two more sheets and, with her roommate, led her out to my car.

But where to take her? It was late in the day. I was new to BU and to Boston. The kid was babbling on in the most bizarre fashion, and I had no confidence that I could maintain my authority with her. Then I remembered what my colleague had told me in his offhand introduction to Boston. "Mass. General," he'd said. "The best hospital in the world. They handle everything." I could get there in five minutes, and I did.

The guard directed us to the psychiatric walk-in unit, and as I led that troubled young girl through the bustling lobby of the White Building—only white for her—she finally panicked and broke away from me. Her roommate froze. The girl's sheets fell as she bolted back out through the doors, naked. I caught up with her halfway across the parking lot. It was so cold she didn't resist when I covered her with my black priest's coat. She fell against me, crying.

At the psychiatric unit a white-coated doctor took the girl into another room while a nurse found out from the room-

(Continued on Page 7)

Another beneficiary of MGH caring: Two weeks after 3-year-old Maria Tsagliotis flew to Boston from Greece critically ill with an infection, she was well enough to return home.

What are they going to do to me? Will I wake up later? Will the operation leave marks? Where will my mother be? When can we go home?

Nurses in the MGH's Surgical Day Care Unit used to hear these questions over and over from children as they arrived to undergo a procedure of one kind or another.

Because they were often inadequately prepared for what was to happen, the children and their parents as well frequently appeared in a highly stressful state.

"An hour before a scheduled operation is no time to begin explaining things," said Elizabeth Gomes, RN, Nursing Administration Supervisor of the surgical unit.

A little over a year ago, Miss Gomes and Arlene Sperhac, Ph.D., RN, Associate Professor of Nursing in the MGH Institute of Health Professions, joined to try to "smooth out the system."

"Ambulatory surgery, enabling patients to return home the same day, is a major innovation in modern health care," Miss Gomes declared. "More than half of the hospital's pediatric surgical procedures are performed in the Surgical Day Care Unit. Future projections indicate that there will be significant increases in the amount and types of outpatient surgery. We felt that any wrinkles in the system had to be ironed out without delay."

Dr. Sperhac and Miss Gomes authored a special pediatric patient information booklet. In addition to receiving it, the parents and child are urged to visit the unit a few weeks before the operation, meet with nurses, anesthetists, and other staff members, and generally familiarize themselves with the surgical environment and routine. The visit follows the day's

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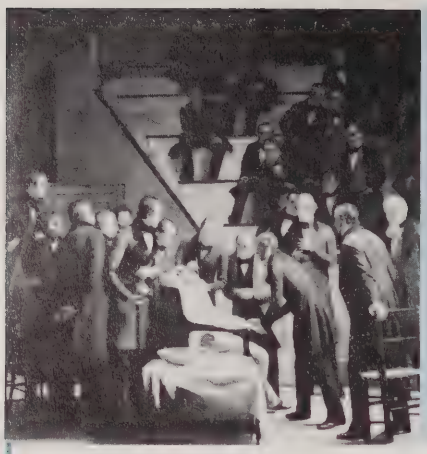

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EDITORIAL:

AIDS: The Worry and the Hope

AIDS has undergone a rather unusual course over its very short history. One would have difficulty recalling any disorder which has attracted and held so much attention so steadfastly. In the past decade Legionnaire's disease and toxic shock syndrome both riveted attention for many months, though not with both the intensity and duration of AIDS.

The uniqueness of AIDS, however, remains the fear and even terror that is occasioned. Legionnaire's disease drew headlines in a large measure because of the mystery that cloaked the newspaper accounts. Toxic shock syndrome provoked interest in part because of involving a product so commonly used by women. But even after probable identification of the causative virus, AIDS continues as a focal point.

For an explanation one can look to at least two major reasons. There is first the nature of the disease itself. By overwhelming the immune system AIDS lowers resistance to a panoply of disorders, some unusual. In a comparatively short time the devastating results render the victim helpless. There is no cure, and there appears to be one universal result—death.

The second major factor is the rapidity with which AIDS is spreading. Every year the number of people developing the problem is doubling, and the days when heterosexuals viewed AIDS as a problem solely for the homosexual community are ending. Heterosexuals can develop AIDS even through sexual transmission.

Clearly AIDS will for the foreseeable future continue to spread. There are, though, good reasons to believe that although the tunnel is long there is a light at the end. It appears as though for person-to-person infection it takes intimate contact to pass AIDS on. As the number of cases grow, fear of acquiring AIDS will probably reduce sexual promiscuity. Very significant is the number of investigators who are making AIDS their top priority. One laboratory test for the antibody to the virus believed to cause AIDS is already available. Improved tests are likely. Better treatment and even a vaccine are other possibilities—though it is impossible to predict a timetable. So the situation is serious. For the optimistic scenario to prevail the research effort must command considerable governmental support. But matters are far from meriting panic.

Ambulatory Surgery

(Continued from Page 1)

work in the unit.

The booklet not only spells out required "do's" and "don'ts" in advance of surgery but the reasons as well. Surgical candidates, for example, must not eat or drink after midnight on the day of a procedure because an empty stomach lessens the possibility of vomiting during the operation.

Dr. Sperhac recalled a mother who said that her child had managed to reach a bottle and consume two ounces of milk well after midnight. That was enough to postpone the day's planned surgery.

A child would occasionally arrive with a runny nose or a slight temperature or without having had a required blood test . . . all reasons to postpone.

Proper preparation of the patient not only facilitates care in the surgical unit but is also highly cost effective. Miss Gomes said that last year each postponed surgical procedure resulted in lost revenue and time and was exceedingly stressful to both parents and child.

In step-by-step fashion, the booklet details the routine that the young patient will face in the unit. Parents are asked to discuss this information with their child, or if the youngster is old enough to read the material, to be ready to answer any questions.

The routine begins with a period of play to wind down, then a change to pajamas and slippers in a private dressing area, and a physical examination. Subsequently, while lying in a parent's arms, a young child receives a medication to produce drowsiness and facilitate transfer to an operating room where another anesthetic is given.

After the surgery, the child reawakens in a recovery room. The stay is brief, usually no longer than a half hour. A reunion with the parents waiting nearby follows, and in just a short while the family can begin the return trip home.

Pediatric patients treated in the Surgical Day Care Unit range from newborns to young people in their late teens. Children in certain age groups seem to focus on particular concerns.

"A child as young as 2 years has some cognitive sense of what is going to happen," Dr. Sperhac said, "and what seems

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Photographs: Pages 1, 8, Myron Daniels; p. 3, Michael Lutch; pp. 4, 5, courtesy of Dr. Hans Bode; p. 6, Ira Miller; p. 7, Chris Maynard
Drawing: Page 7, Marjory Wunsch

to frighten him most is separation from his mother. So, in dealing with this youngster, we stress that the parent will never be far away.

"With a 4-year-old the principal concern might be body injury. Will they hurt me? With young, school-age children, there is an overwhelming sense of modesty. They have to disrobe, and people will be looking at them. With adolescents, the preparation can be very much the same as with adults.

"A well-prepared child is going to be much calmer, more trusting, and a whole lot more cooperative because he will not be in for any surprises."

The children realize from their earlier visit that the people wearing the strange-looking clothing are not terribly threatening. Having seen staff members without their masks on, the children are not frightened later by the sight of a covered face.

The unit encourages young children to bring along their favorite doll or other toy on the day of the surgery. Just as the patient receives an identification bracelet with his name on it, so does the toy, and it stays with him at all times, even in the operating room area. A familiar object close at hand provides the child with a heightened sense of security.

"It is very important to be honest and truthful when a young patient asks questions," Miss Gomes said. "You have to tell it like it is without putting extra anxiety or fear into the child. That's one of the skills of the nurses."

Dr. Sperhac added that when information is withheld the children fantasize and "the fantasy is quite likely to be much scarier than what will actually take place."

After receiving a preliminary anesthetic, this child fell asleep in his parents' arms, facilitating transfer to an operating room for day care surgery.

The nurses place as much emphasis on educating the parents as they do the child. With the youngster returning home almost immediately, the parents play key roles in the postoperative process. They must know what to watch for, e.g., a drainage from a wound, extra swelling, inability of the youngster to flex a leg after a muscle biopsy. The parents must feel confident of fulfilling their new responsibilities when they leave the hospital.

The campaign to acquaint people with what goes on in a surgical unit extends to school groups as well as families. Graduate nursing students from the MGH Institute who are specializing in child health coordinate school tours. Back in class, the children often draw pictures of instruments they had been shown, such as needles, blood pressure gauges, and thermometers.

Miss Gomes and Dr. Sperhac are beginning to evaluate their educational programs. Have they helped to lessen the surgical postponements?

"We anticipate a reduction," Miss Gomes said. "One might tend to equate cost effectiveness with a compromising of care, but actually one can offer care that is both outstanding and cost effective. It requires planning, however, and that means a lot of communicating." ■

African Pygmy Tribe Comes Under MGH And Harvard Study

In a dense rain forest in northeastern Zaire, at least 200 miles from any town, lives one of Africa's most isolated populations, the Efe Pygmies.

Seven months of the year they camp near the edge of the Ituri Forest and tend the gardens of their only neighbors, the Bantus. Payment takes the form of salt, various plant foods, cloth, and sometimes a little metal with which to fashion arrow heads.

A narrow dirt road runs past the crude huts of the two tribes, but settlers abandoned it more than 20 years ago. During the long rainy season, the road, often more like a path, becomes impassable.

The Pygmies devote five months of the year to hunting. They forego their roadside camps and plunge deep into the rain forest, setting up temporary homes as they move about in search of small antelope and other game, such as monkeys.

The independent and primitive lifestyle of these little people so impressed a team of Harvard University scientists that in seeking to analyze Pygmy growth, sociological, and cultural patterns they elected to concentrate on seven camps of the Efe tribe, with a population of close to 140 Pygmies. The camps were associated with five villages of 170 Bantus.

With the search, financed by the National Geographic Society, thus narrowed, Harvard's Department of Anthropology, under Irven DeVore, Ph.D., established a study site in the Ituri Forest in 1980 with funds awarded by the National Science Foundation.

Led by Peter T. Ellison, Ph.D., of Harvard, and Robert C. Bailey, Ph.D., now of the University of California at Los Angeles, the team members were joined last November by Dr. Hans H. Bode, an MGH pediatric endocrinologist, as medical adviser.

Speaking at a meeting of the Children's Service (Pediatric Grand Rounds), Dr. Bode told of six weeks during which he lived among the Pygmies in the former Congo and studied both their physical makeup and ways of life.

Dr. Bode traveled by plane, truck, and foot to reach the tribe at its forest-edge camps. The Harvard group compared the

(Continued on Page 4)

Efe Pygmies Subsist on an Unusual Diet

(Continued from Page 3)

health and habits of the Pygmies with those of the Bantus, who are primarily agriculturalists.

The Pygmies have their own language, and the Bantus speak a Sudanese dialect, but the two groups communicated with the investigators in Swahili.

"Our hosts were extremely friendly," the MGH pediatrician said. "Bob Bailey had lived with them for more than two years and was very well liked.

"The Pygmies were so cordial that they bent over backward not to hurt our feelings. When we gave them bread and jam on one occasion and they disliked the food, they didn't throw it away in front of us. Instead, they carried it into the forest and disposed of it there."

The Pygmies craved their native honey. When tribal men came upon honey during trips out of camp, they often gorged themselves, each consuming up to a pound of the delicacy at a single sitting.

They would then jump into a nearby river and drink and drink. On returning to camp, their stomachs bulging, the men would be asked by their wives why they had not brought home any honey. The response would be, "We didn't find any."

The Pygmies are truly little people, the men standing about 4 feet 9 inches tall and weighing under 100 pounds, the women generally three inches shorter and about 80 pounds.

Although the women toiled long hours, often carrying loads that exceeded 75 percent of their body weight, they appeared better nourished than the men, who were muscular but very lean.

Dr. Hans Bode examines a 21-year-old Pygmy whose stunted growth may have resulted from his mother's iodine deficiency.

The diets of the men varied widely in caloric content. Although they sometimes consumed excessive calories, they were extremely active, seemingly always on the move. While hunting in the forest, their daily food intake dwindled, often to 800 calories a day or less.

Meat accounted for only five percent of a Pygmy's total diet. The single food providing the greatest number of calories—30 percent of the diet—came from the cassava plant. The leaves taste like spinach, and the root provides the natives with their principal carbohydrate source.

The plant, however, contained a substance which produced cyanide. In the human body, the acid detoxifies to thiocyanide, but this still antagonizes iodine utilization by the thyroid gland and has been known to cause problems such as brain damage and deafness.

In a region that has a marked deficiency of iodine, the added inroad of thiocyanide would be expected to heighten a likelihood of goiters among the Pygmies. The Bantus, who also eat cassava, develop large goiters, but the Pygmies surprisingly seem spared. The few goiters found among them were relatively small.

"I suspect there is a genetic difference in their sensitivity to thiocyanide," Dr. Bode said. "Studies have produced some evidence that the sensitivity may vary within the human population."

Each native received a cupful of salt for cooperating with the Harvard researchers, but it was not iodized salt. "Such salt was impossible to buy," Dr. Bode said. "If we had it to distribute, it probably could have improved the goiter situation markedly, despite the consumption of cassava."

In northeastern Zaire the principal dry season lasts from December to February. This is when the Pygmies and Bantus must team up to clear the land and replant. "Slash and burn" farming, it is called. If the drought is too short or extremely long, the gardens fail to produce, and food becomes scarce.

The Pygmy birth rate is low. This has been attributed to venereal and pelvic inflammatory diseases among the women, but studies by Dr. Nadine Peacock and Dr. Ellison also indicated a periodic lack of ovulation perhaps related in part to occasional food shortages.

Dr. Bailey had evaluated scores of menopausal women among the Pygmies. He found that 29 percent of those entering menopause had never been pregnant. Another 18 percent bore only one child. The average number of children in a Pygmy family was 2.7, particularly small among Third World peoples.

Dr. Bode, who is also Associate Professor of Pediatrics at Harvard Medical School, believes that nutrition and genetic makeup may account for the short stature of the Pygmies. He would like to return to Zaire some day and institute a nutrition program, controlling the types and amount of foods the Pygmies eat, to determine whether they can be helped.

Carrying instruments to record the height and weight of Pygmy tribal members, Harvard anthropologist Thomas Ellison, left, and Dr. Bode trudge along a nearly overgrown road in Zaire's Ituri Forest.

Previous research suggested that the Pygmies had normal levels of growth hormone produced by the pituitary gland, but that something appeared to be affecting the hormone's customary instructions to the liver to increase its output of somatomedin, a protein which directly stimulates bone growth.

The earlier investigators found somatomedin levels to be abnormally low, as low as those associated with growth hormone deficiencies.

Dr. Bode's findings, although preliminary, were different.

"We found a definite correlation of somatomedin to age, the levels higher in the young and lower in the old, as one would expect," he said. "Moreover, the somatomedin was quite acceptable during puberty and elevated with pregnancy."

The investigators compared the Pygmy study results with somatomedin levels found in the much taller Bantus. No striking differences were noted.

The Pygmies have more than their share of illnesses. Twenty-six percent of the population have been reported to be carriers of sickle cell anemia, a genetic abnormality which strikes one of every 400 black Americans. When exposed to low oxygen levels in the blood, the red cells assume a sickle, or crescent, shape which impairs the oxygen-carrying capacity of the cells.

Six-footer Robert Bailey, Ph.D., of the Harvard-led team, with two Pygmy adults; their glasses were borrowed from the researchers.

Dr. Bode treated a number of natives for gonorrhea, intestinal disorders, and upper respiratory infections, "Many suffered from emphysema," he said.

The men smoked almost incessantly, sometimes tobacco, oftentimes marijuana. Each of the gardens they tended had a little patch set aside for the growing of "pot." "The Pygmy men often seemed glassy-eyed," Dr. Bode declared.

Both men and women smoked tobacco but in an unusual way. They would roll tobacco leaves, light them, and then put the lighted end into their mouths.

"Every once in a while, I asked permission to look into a smoker's mouth," the doctor said, "but I never found any burns." ■

Alcohol: A Great Peril for an Unborn Child

During the early 1700s, excessive drinking in England resulted in so many family breakups that Parliament named a special commission to probe the epidemic.

The panel sought to learn what effects parental alcoholism was having on children.

The report was alarming. Among families of alcoholic parents, the panel found very high rates of stillbirths, deaths during infancy, mental retardation, and susceptibility to seizures.

In 1751, Parliament instituted very stringent distillery laws to try to reduce the nation's alcohol consumption. But the statutes had little effect. Early reports on the dangers of alcoholism were not very scientific, therefore not widely believed.

Not until the late 1960s did researchers narrow their focus. They began to concentrate specifically on maternal alcoholism and how that might affect the fetus.

The result was discovery of a disorder which has become known as the Fetal Alcohol Syndrome (FAS). It is diagnosed today in 1 of every 650 live births in the United States.

"We know that alcohol crosses the placenta, and within 15 minutes the fetus has the same blood alcohol level as the mother," said Dr. Eileen M. Ouellette, an MGH pediatric neurologist who has done research on the syndrome.

"The fetus lacks the liver enzymes needed to break down alcohol. So it circulates in the fetal blood until it can cross back into the mother to be broken down by her liver. And the small size of the fetus makes the alcohol's impact greater.

"The alcohol's effects, therefore, are magnified in the still unborn child. Detectable levels of alcohol are present in the fetus long after the alcohol has totally cleared from the maternal blood stream."

A diagnosis of FAS requires these findings: retarded growth, a central nervous system disturbance such as delayed development, a neurologic abnormality, or intellectual impairment, and at least two of the following congenital head defects, a small brain, small eyes, or a poorly developed area between the base of the nose and the upper lip.

"Fetal Alcohol Syndrome is probably the third most common known cause of mental retardation, behind lack of oxygen at birth [hypoxia] and Down syndrome," said Dr. Ouellette, who also serves at the Eunice Kennedy Shriver Center in Waltham, Mass.

The Center and the MGH Neurology Service are closely affiliated. At Shriver, Dr. Ouellette directs the University Affiliated Facility, an outpatient unit which evaluates individuals with developmental disabilities.

Since not all babies of women who drink heavily are abnormal, Dr. Ouellette and several colleagues at the Boston University School of Medicine began a study of patients at Boston City Hospital in 1974 to evaluate the risks that offspring face from maternal alcohol abuse during pregnancy.

A total of 633 women took part. They were classified into three groups: abstinent and rare drinkers (less than one drink a month), moderate drinkers, and heavy drinkers (three or four drinks on an average day plus five or more on an occasion).

The study results, published in the *New*

(Concluded on Page 6)

Continued Drinking Raises Risk to Fetus

(Concluded from Page 5)

England Journal of Medicine in 1977, showed that 32 percent of infants born to heavy drinkers demonstrated congenital abnormalities as compared to 14 percent in the moderate group and 9 percent in those who never or rarely drank.

Nutritional intake, drug use, and sociologic factors were not significantly different among women in all three groups and did not account for the findings.

Dr. Ouellette, principal author of the journal article, wrote that 15 of the heavy drinkers significantly reduced their alcohol intake during the pregnancy, and 10 (67 percent) of the 15 had normal babies. Only 2 (7 percent) of 27 women who drank heavily throughout pregnancy had infants who were thought to be normal at delivery.

Studies of laboratory animals have shown that the effects of alcohol on an animal fetus are dose-related; that is, the greater the alcohol consumption, the greater the peril to the offspring. The type of alcohol (liquor, beer, or wine) is not important. Once alcohol replaces a certain percentage of the diet, stillbirths occur.

Data on human survival are incomplete but do suggest that if a woman continues to drink heavily, the risk to the fetus increases with each successive pregnancy.

The spectrum of abnormalities that identify FAS relates not only to the amount of alcohol that a woman consumes but also to when she drinks.

"If a woman drinks heavily early in her pregnancy, the offspring is more likely to suffer physical malformations," Dr. Ouellette explained. "If she drinks late in the pregnancy, then the child is more apt to develop problems with growth."

Maternal alcohol use may be expressed only partially in a child. Physicians refer to this condition as Fetal Alcohol Effects (FAE). The diagnosis applies to any abnormalities seen in children short of the full syndrome as a result of heavy or moderate alcohol use by women during pregnancy.

In addition to congenital malformations reported in FAS, a number of behavioral effects occur in both FAS and FAE.

Many of the children have learning disabilities. Unlike the classical patterns, however, sometimes no definitive areas of strengths or weaknesses can be determined. The children are often easily distracted and have problems of motor coordination.

Kindergarten teachers often turn out to be the first to identify these difficulties. The less severe the symptoms, the longer the diagnosis of FAS or FAE is likely to be delayed.

Dr. Eileen Ouellette examines a baby suspected of having Fetal Alcohol Effects.

Unlike genetic disorders, Dr. Ouellette pointed out, FAS and FAE are totally preventable. "Young women of childbearing age should be taught in high school health classes about the risks of drinking alcohol during pregancy," she said, "and colleges should inform their students about the conditions that can occur.

"The first few weeks of pregnancy are those during which major organ systems form. High alcohol intake during those weeks may have serious effects on the baby even before the woman is certain that she is pregnant."

No one knows whether there is a safe amount of alcohol that an expectant mother can drink. And Dr. Ouellette knows of no specific test that can predict FAS. "Ultrasound can disclose if the child is microcephalic [having a small brain]," she said, "but I don't think there is anything that can make this diagnosis of Fetal Alcohol Syndrome before birth."

Out of prudence, therefore, just as physicians advise their maternity patients to rest, eat nourishing foods, and stop smoking, she said, so should doctors also recommend abstinence from alcohol, thus maximizing the likelihood that the baby will be healthy.

In New England, many counseling centers specialize in helping women who find it difficult to stop drinking, but there are few centers which assist parents in caring for children born with FAS or FAE. The Shriver Center has a comprehensive diagnostic and treatment program for children throughout New England with FAS or FAE.

"In their first year of life, feeding problems are paramount," said Dr. Ouellette, who is also Assistant Professor of Neurology at Harvard Medical School. "While these children tend to suck more than a normal baby, they don't swallow well. They're hungry, slow to gain weight, irritable, and generally difficult to care for. But much can be done for them.

"As a child grows and needs become apparent, they can be dealt with readily through early intervention programs. Parents can be helped with such issues as nutrition, development, language delay, and gross and fine motor problems. Early diagnosis permits the special educational needs of the children to be appropriately and promptly addressed.

"I've been immensely impressed over the years with how well some of these children have fared with love from their families and a lot of support from professionals." ■

"The Girl Had His Absolute Attention. . ."

(Continued from Page 1)

mate how to reach her parents. I waited in the crowded vestibule with the bundle of her sheets, worried for her, but also aware of the contrast her white drapery made against my clerical black.

The doctor soon came out. What did I expect? Smugness? Detachment? Superiority? How do the doctors at the best hospital in the world behave? Why was I braced for a show of anything but what I saw? The field of his concentration had been completely taken over by his concern for the girl. Yes, she was seriously disturbed. And yes, she had to be taken care of immediately.

The doctor told me that he had just spoken to her parents in a distant state, and they had referred him to the psychiatrist who had treated her before she'd come to Boston. The best thing would be for the girl to fly home at once. Her psychiatrist was already arranging to meet the airplane.

Airplane? But who would take her? I felt his eyes on me. I had meetings, appointments, duties. I was a busy man. . . .

Before I could give voice to any of the less than generous first reactions this apparent demand stirred in me, and before I could overrule them, the doctor said, "I've arranged it. There's a plane in a half hour. I'll fly home with her."

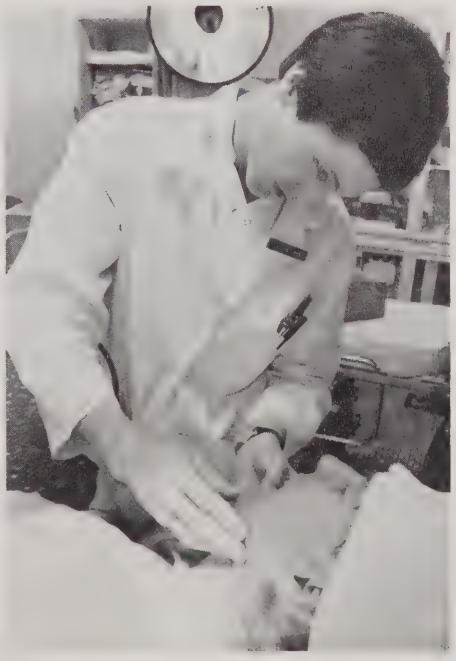
"You?" But you're a doctor! You're even busier than I am!

"Thanks a lot, Father," he said. "She's lucky she had you when she needed you." And then he turned to the secretary to rearrange his schedule. The girl had his absolute attention now and would have it for as long as she needed it. I was chastened and amazed and thought, No, she's lucky she has you.

In Boston we take our hospitals for granted. It is commonplace to describe several of them as among the very best in the world. Their excellence is a function, obviously, of their association with three great medical schools. At the center of the medical constellation is Massachusetts General Hospital, the parent institution—Harvard Medical School derived from the hospital, not vice-versa—of the whole Boston system.

The General was founded in 1811, and it has always had three purposes: taking care of the sick, teaching the people who do that, and trying to discover the causes and cures of sickness. The latter two objectives—teaching and research—are what have made Mass. General famous. They have resulted, on the one hand, in the medical school, and, on the other, in some of the great breakthroughs in medicine.

In 1846 doctors at MGH pioneered the use of anesthesia that made modern surgery possible. They were the first to solve the problems associated with bladder stones (1878), abdominal surgery (1886), lead poisoning (1926), and endocrine disorders (1929). Their use of radioactive iodine (1937) was a crucial step in the development of nuclear medicine. They were the first to reattach a person's severed arm (1962), and they taught the world how to freeze blood (1964). Only a couple of years ago, they invented artificial skin, which will make all the difference for burn victims.



At work in the MGH Emergency Ward

But the mere recitation of a litany of such wonders, and even the knowledge that today some of the brightest minds in the world are at Mass. General—acutely focused on solving yet more problems, yet worse ones—can leave us only vaguely moved. We are accustomed to the hosannas that regularly greet the work of Harvard wizards. In Boston, one could almost say, we take their accomplishments for granted.

That's why I began this reflection with an anecdote that has nothing to do with teaching or research, the things that made Mass. General famous. What we don't take for granted at all anymore, anywhere, is the simple act of human caring. Who would have dared hope that at this mega-hospital, with its staff of a thousand grant-obsessed geniuses, and its labs chock-full of high-tech miracle machines, doctors would remember what it is all for? When a kid is on the far edge of her sanity you drop everything, even the schedule, to get her what she needs.

A year ago my wife's brother who lives in Colorado had a serious health crisis. He had always been a robust, athletic man, an avid mountain climber and first-class skier. But for some time a strange paralysis had been slowly depriving him of the full use of his limbs. Doctors in Denver gave him conflicting diagnoses, including one that blamed the problem on mercury poisoning from the fillings in his teeth. He had the fillings removed, but the condition worsened. My wife and I became alarmed and we encouraged him to come to Boston. "Let them check you out at Mass. General," we said. "It's the best hospital in the world."

He came, was diagnosed as suffering from impaired nerves in his spinal column, and was operated on twice. Now he is nearly recovered. My close observation of his experience at Mass. General is what has prompted this salute. I was not surprised that doctors there were able to treat his illness, but I was surprised at how well they treated him.

I shouldn't have been. One of the two doctors who operated on him, removing a bone spur from the back side of his neck, though entering from the front, was Peter Black, a neurosurgeon, an associate

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"We Need So Much From Doctors Now. . ."

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professor at the medical school, and a leading researcher in the field of pituitary tumors. He also holds a Ph.D. in ethics from Georgetown University.

Obviously, he is one of those extraordinarily gifted people whom one is not surprised to find associated with the General. But I've known Peter from another side for many years. He's a neighbor of mine, and I've long appreciated his warm humanity. I've admired his diligence as a father and his good-humored enthusiasm as a husband. The surprise is that qualities we assume to be divergent—technical expertise and heartfelt sensitivity—could be combined in one person. Hasn't our world been divided into engineers and humanists, technocrats and poets, scientists and philosophers? That division rarely bothers us. Who needs physical dexterity from a favorite poet? Who needs compassion from an IBM service person? Or a knack for pipe fitting from a tax accountant?

But doctors are different. What we need from them is everything. If a man is going to mess with the nerves in your spinal column, you want him to have a better mind than Noam Chomsky's and better hands than Doug Flutie's. And if that same man has to talk to you about the possibility that you'll come out of the operation a quadraplegic—or the possibility that you won't come out of it at all—you want him to be better than Rollo May at hearing your fear and better than Elizabeth Kubler-Ross at helping you through it.

Flaubert said that soldiers, artists, and priests deal with death every day. Finally death is our subject here, and no one deals with it more than doctors and nurses. Death, they know, is only the other side of life, and that is why its great questions—When does life begin? When does it end?—are particularly theirs. We need so much from doctors now, partly because so many other great institutions of society, especially those of the soldiers, artists, and priests, have faltered.

Doctors falter too, of course. Every time we read of another doctor or hospital sacrificing the essence of the vocation—caring for the sick person—to the merciless gods of science or celebrity or commerce, we shudder because we know that, in larger measure than we want, doctors are what's left between us and death. They are what the artists and priests once were exclusively—the custodians, indeed champions, of human life.

My experience of the General is limited. I've had only a few encounters with it over the years, but they've been important ones. As a chaplain I had several occasions to get help for students there. In addition to my brother-in-law, my wife has been operated on there and so have several close friends. Everyone I know who has been an MGH patient has received excellent care from the entire staff. Over the years I've made the acquaintance of many Mass. General doctors, and I've come to know several well enough to see confirmed my impression that as a group they do combine the technical expertise we want with the unusual human sensitivity we need. I'm thinking now, in particular, of Dr. Richard Pingree, director of the medical walk-in unit, and Dr. Edward Campion, chief of the geriatric unit.

Still what does any of this really qualify me to say? Not much, perhaps. But no one sees more than a small slice of the reality of a large, complicated institution like this hospital. And no one ever fully appreciates what a momentous, transcendent, and finally—for it is death we're talking about—impossible task these people have taken on for us. It seemed to me important, in this skeptical and pervasively disappointed time, to say that, as I have seen it, something precious is happening at the General, something rare, and something that, sooner or later, every one of us will want desperately. ■

Dr. Peter Black confers with Betsy Beglin, RN, in the Surgical Day Care Unit.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 6 September, 1985

Sharpening Abilities to Detect Early Breast Cancer

A Pituitary Tune-Up Offers Many Benefits

As if programming a computer, specialists today are fine tuning the body's pituitary or so-called master gland to relieve many disorders that can interfere with reproduction, growth, and maturation.

In only the past six years, pituitary reprogramming techniques have found applications in the treatment of diseases in such fields as endocrinology, gynecology, pediatrics, oncology, and internal medicine.

Involving a substance known as gonadotropin releasing hormone (GnRH) or derivatives (analogues) of it, the treatments, which vary considerably, can:

- Help to correct lack of menstruation (amenorrhea) in women
- Activate puberty in men who never experienced it
- Delay puberty when it develops prematurely and threatens short stature
- Replace surgical castration with a reversible chemical method as a treatment for prostate cancer
- And provide a reversible alternative to the removal of ovaries as a treatment for breast cancer.

Dr. William F. Crowley, Jr., Chief of the Reproductive Endocrine Unit at the MGH's Vincent Memorial Hospital where at least three of the above advances were achieved, predicts that one of the widest applications of anything developed in his laboratory will be the treatment of fibroid tumors. One of the most common causes of hysterectomies in this country, these tumors account for perhaps a billion dollars' worth of surgery each year.

"Using GnRH analogues," he said, "we can cause uterine

(Continued on Page 2)

A regulated infusion of pituitary hormone enabled Karen Wolkovich of Amesbury, Mass., to have Leah, shown at 4 months.

The MGH Cancer Center is waging a multipronged campaign to help reduce the nation's staggering death toll from breast cancer.

The American Cancer Society estimates that the disease will strike 119,000 women and take more than 38,000 lives in the United States during 1985.

Much progress has been made with mammography (breast X rays), however, to detect the disease earlier when chances for a cure are greater. Dr. Daniel B. Kopans, Director of Breast Imaging in the MGH Department of Radiology, added that the hospital "has also been at the forefront in the use of such technologies as ultrasound and computerized body tomography [CBT] for breast evaluation."

Behind the scenes, researchers are working to perfect a computerized digital system which not only would improve the accuracy of mammograms but also reduce the levels of radiation to which patients are exposed.

In addition, studies have begun into possible uses for magnetic resonance imaging (MRI) and lasers in diagnosing cancers of the breast.

"Ninety percent of breast tumors begin in the lining of a milk duct," Dr. Kopans said. "We want to find cancers while they still lie within the duct, or, if they have already invaded surrounding tissue, while still under one centimeter [about three-eighths inch] in size. Clearly, we would also like to detect the tumors before axillary [armpit] lymph node involvement occurs."

If lymph nodes turn out to be involved at the time of diagnosis, the patient's chances of surviving five years are calculated to be about 50 percent. A negative lymph node test result indicates a

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EDITORIAL:

Breast Cancer: An Improving War

For psychological as well as physical reasons, a diagnosis of breast cancer is dreaded. Mutilation and loss of life come instantly to mind. Yet the war against breast cancer has never gone better. Improvement in diagnosis is one of the reasons.

In 1983 exactly 300 New England women had breast cancer diagnosed or were given the first course of treatment at the MGH Cancer Center alone. That figure represents more than the total estimated 1985 cases in the entire state of Vermont, or three-fifths of all the cases in New Hampshire, half those in Maine, or nearly half those in Rhode Island.

With the latest systems of mammography, specialists can often detect breast cancer two to three years before it is large enough to feel. In response the American Cancer Society and the American College of Radiology have lowered the age at which they recommend mammograms. The old guidelines were for women more than 50 years old to have annual examinations. Now women 40 to 49 are candidates every other year. Women 50 and older remain once-a-year candidates.

Obviously early detection provides a much better chance of cure. Over a period of time screening women without symptoms offers at least a 25 to 30 percent reduction in breast cancer deaths.

Evidence is also accumulating that for carefully selected patients it is possible to effect as many cures through removal of the cancer area alone plus radiation therapy as is brought about by removal of the entire breast and surrounding tissue. The use of the "lumpectomy" thus saves women from loss of a breast and all the attendant psychological distress.

The advances in treatment of breast disease are significant. They promise to become much greater in the future as investigators learn to apply exciting new tools. Still diagnosis of cancer depends in a large measure on the patient. It is the patient who can often detect cancer's warning signs at an early point. In the matter of breast cancer, that means monthly self-examinations in addition to following guidelines about mammography. The Lord helps those. . .

Pituitary Control

(Continued from Page 1)

fibroids to regress. This method is being actively explored around the country now as an alternative to removal of the uterus."

Dr. Crowley and an MGH Fellow from Italy, Dr. Marco Filicori, working in the Vincent Research Laboratories, were the first to report this work, published in the *American Journal of Obstetrics* and *Gynecology* in 1983.

Although most people regard the pituitary as the master gland, it actually works

A pump, worn at the waist, overcame defective pituitary function by delivering hormone in a normal pattern.

for an organ in the brain called the hypothalamus, which sits atop the pituitary.

The hypothalamus receives input from the senses and other sources and dispatches releasing factors to the pituitary. One of these, known as GnRH, regulates the pituitary's release of gonadotropins which, in turn, control the gonads: the testicles in men and ovaries in women.

During the late 1960s and early 1970s, scientists at the Salk Institute and at Tulane Medical School became the first to isolate and characterize the activity of GnRH. For their discovery, Drs. Roger Guillemin and Andrew V. Schally won the Nobel Prize in Medicine in 1977.

Initially, GnRH studies by others concentrated on the hormone's potential role as a diagnostic agent. With funding by the National Institutes of Health and various pharmaceutical firms, Dr. Crowley looked more toward treatment possibilities.

Photographs: Pages 1, 2, 3, 4, 5 (upper), 6, Myron Daniels; p. 5 (lower), courtesy of Dr. Daniel Kopans; pp. 7, 8, courtesy of Dr. James O'Connell.

Drs. William Crowley and Nanette Santoro confer in the Vincent Research Laboratories.

In collaboration with Dr. Janet W. McArthur of the MGH Gynecology Service, Dr. Crowley initiated a program to use GnRH to stimulate the pituitary glands of women who were not ovulating regularly.

"Some defect in the hypothalamus was preventing secretion of gonadotropin releasing hormone in the proper amount or pattern," he said. "Like a computer, you can have the hardware . . . the hypothalamus, pituitary gland, and gonads . . . but if you don't have the proper software, or programming, normal gonadal function will not take place."

Early GnRH studies on laboratory animals by Dr. Ernst Knobil, head of the Physiology Department at the University of Pittsburgh, showed that intermittent or pulsatile delivery of the hormone would stimulate the pituitary while continuous delivery would suppress the gland. Shortly after, Dr. Crowley's group, using GnRH analogues, showed this action was also true for humans.

To treat their nonovulating patients, the investigators studied patterns of intermittent hypothalamic secretions in people who had no reproductive disorders. This enabled the doctors to determine what constituted a normal pattern.

With portable, beeper-sized infusion pumps worn at the waist by each patient as a sort of artificial hypothalamus, GnRH was administered in the normal intermittent frequency. The technique reversed a number of disorders.

Drs. Crowley, Filicori, and Nanette F. Santoro have treated some 50 women with amenorrhea and have enabled virtually all to ovulate. The physicians also induced fertility in 60 to 80 percent of those women desiring it.

Using the same treatment approach, Dr. Crowley and two Fellows in his unit, Drs. Daniel I. Spratt and Joel S. Finkelstein, produced puberty in a number of male patients who had never experienced it. All were over 18 years of age.

The first pregnancy in the world involving a man whose puberty resulted from this treatment was reported by the MGH in the *New England Journal of Medicine* in 1982.

Since women ovulate monthly, the decision on how long they must use the hormone delivery pump becomes a month-by-month issue. Once they conceive, they can forego the pump immediately. As for men going through puberty, they have worn pumps for as long as three years and obtained the desired results.

The ability to control GnRH activity took a major spurt in a collaboration between Dr. Crowley's lab at the MGH and Drs. Wylie Vale and Jean Rivier at the Salk Institute.

Since the hormone consists of only 10 amino acids—the chief components of protein—the Salk investigators found that by making only minor changes in the natural sequence of the acids, they could produce analogues more powerful than the original hormone, and thus capable of influencing it in a selective and reversible way.

Using these analogues, Dr. Crowley was the first to demonstrate that they could be highly effective in treating children suffering from precocious, or premature, puberty.

"Breast development in a 4- or 5-year-old can be very distressing for the child and her family," Dr. Crowley said. "Similarly, the appearance in young boys of secondary sexual characteristics such as testicular growth can embarrass them.

"In addition, the appearance of sex steroids [estrogen in girls and testosterone in boys] too soon in life results in an early growth spurt and then a premature fusion of bones. The children are left with permanent short stature."

Dr. Crowley said that working in collaboration with Drs. John Crawford and Paul Boepple at the MGH and Drs. John Crigler and Joan Mansfield at Children's Hospital in Boston "we have been able to suppress this pubertal process until a time of the patient's and family's choosing."

In males with prostate cancer, testosterone feeds the tumor like gasoline on a fire. To decrease pain and other ravages of the cancer, the treatment has been removal of the gonads (surgical castration). With the GnRH analogues, however, physicians can block the testosterone until the cancer is overcome.

Altering the hormonal environment also applies to the treatment of breast cancer in women. Instead of removing the ovaries of such patients, GnRH analogues again provide a reversible alternative.

Another benefit of GnRH reprogramming is the suppression of polycystic ovarian disease, a condition in which the ovaries produce too much of the male hormone and cause excessive hair growth. And the analogues can help to treat endometriosis, a disorder in which membranous tissue normally lining the uterus grows in the wrong place, causing pain and infertility.

Dr. Crowley, who is also Associate Professor of Medicine at Harvard Medical School, said researchers are studying the possibility of using GnRH manipulation as a technique for contraception.

"The problem with this approach," he said, "is that you can suppress the pituitary gland so completely, you essentially have produced castration, and this means that sex steroid levels drop very low. This creates impotency in males and hot flashes and other signs of estrogen deficiency in females.

"Over the short term, these are not serious problems, but they can become so over the long term. For contraception, some sort of method has to be devised whereby the GnRH analogues are used in conjunction with some form of replacement of sex steroids." ■

Guidelines Relaxed For Breast X-Ray Screening Exams

(Continued from Page 1)

five-year survival probability of 85 percent.

Dr. Kopans said that mammography can frequently detect a breast cancer two to three years before the growth is large enough to be felt (about two centimeters in diameter).

Studies of improved mammographic systems which have demonstrated this capability influenced the American Cancer Society and the American College of Radiology to revise mammographic screening guidelines.

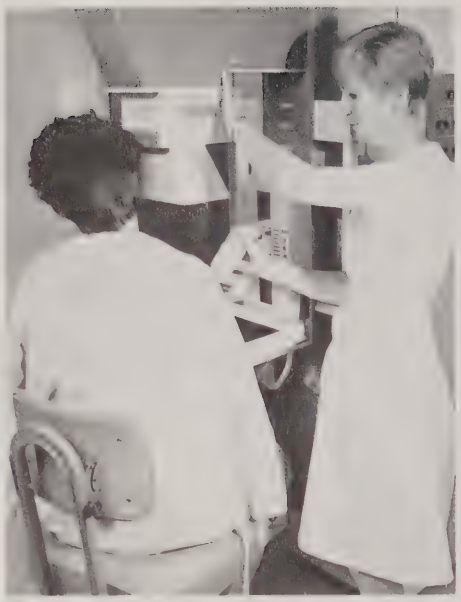
Instead of restricting mammographic examinations of symptomless women to those over the age of 50, the recommendations now urge that such tests be obtained every year or two years by women between the ages of 40 and 49 and then once a year for those 50 and older.

"It is essential to realize that mammography is not a perfect test," said Dr. Kopans, who also serves as Assistant Director of Outpatient Radiology in the MGH's Wang Ambulatory Care Center. "This test does not find every cancer. In fact, some small cancers that can be felt may not even be detected by mammography."

He explained that the appearance of a breast on a mammogram can vary tremendously. "Some breasts contain a large amount of fat and, to an X ray, fat is like a window," he said. "The X rays penetrate fat beautifully. Anything in such a breast that is not fat, such as a cancer, can be seen very clearly.

"In some women, however, particularly younger patients, the breast is quite dense, having considerable fibrous or glandular tissue with the same water densities as a significant number of tumors. Trying to see a cancer when it is surrounded by such tissue is as difficult as trying to see a tree for the forest."

Dr. Kopans said that although mammography can detect many small cancers before they can be felt, 8 to 10 percent of cancers will not show up on a mammogram. Thus, physical examinations that include feeling the breast in a very systematic fashion and monthly self-examinations by the patient herself continue to play an important role in breast cancer detection. The Breast Imaging Section works very closely with physicians in other departments to provide a comprehensive breast assessment.



Radiologic Technologist Christine McGlory prepares to give a mammography test.

Whether a physician becomes suspicious of a shadow viewed on an X ray or a lump discovered through manual manipulation (palpation), further studies must be conducted. This is where ultrasound can be a valuable tool.

Some cancers are typical in their appearance and makeup, and a specialist such as Dr. Kopans can then often say with 99 percent certainty that cancer is present. But many cancers are not typical.

Employing the same principle as the wartime underwater detection system called sonar (*MGH News,* June–August 1974 and December 1979), ultrasound probes the breast with high frequency sound waves. Echoes from the sound produce an image on a screen. The image can differentiate between a solid mass and a fluid-filled cyst.

A cyst almost always proves to be benign. By inserting a needle and withdrawing the fluid, a doctor can cause the lump to disappear. Disclosure of a solid mass would prompt a biopsy, surgical removal of some suspicious tissue for laboratory evaluation.

Ultrasound once came under study as a possible method of screening for breast cancer without involving radiation. A recently concluded long-term evaluation at the MGH, in which some 1,000 women participated, conclusively demonstrated no role for ultrasound in breast cancer detection but confirmed the technology's role in evaluating lesions made known by mammography or physical examination.

Computerized body tomography also does not qualify for a screening role, but in selected patients CBT provides valuable guidance in preparations for a biopsy.

"On occasion, we find things in a breast that can only be viewed from one direction," said Dr. Kopans, who is also Assistant Professor of Radiology at Harvard Medical School. "Guiding a surgeon to

Dr. Daniel Kopans and Radiologic Technologist Maureen Doyle study a mammogram.

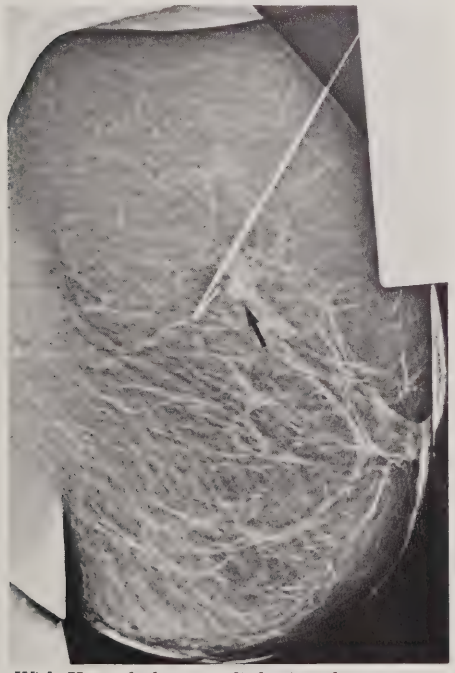
the suspicious tissue becomes very difficult. If we cannot provide a three-dimensional view with ultrasound, we turn to tomography."

CBT comes into play, for example, when a lesion lies near the patient's chest wall. Since the breast curves around the chest, ribs may hamper attempts to X ray the lesion. CBT offers a cross-sectional image allowing the radiologist to very clearly see from the breastbone (sternum) right around into the underarm area.

Dr. Kopans and his staff have devised methods for precisely guiding a surgeon to tiny areas in the breast. One technique involves use of a special springhook wire system which Dr. Kopans invented. A radiologist inserts a needle into the breast, finds the growth under X-ray guidance, then places a hooked wire through the needle to grasp the suspected tumor, thus enabling the surgeon to find it later in the operating room. This has permitted more accurate guidance than previous techniques.

Each day the MGH Breast Imaging Section performs between 30 and 40 mammograms and 3 or 4 ultrasound tests, equaling or surpassing all other such departments in New England. Of some three percent of the women found to have a suspicious growth, fewer than a quarter turn out to have cancer.

If the suspected lesion turns out to be benign, only a small amount of tissue will have been sacrificed. If a malignancy is present and the patient elects not to have a mastectomy, the accuracy of the localization can permit the patient to have radiation therapy and enhance the chances for a good cosmetic result.



With X-ray help, a radiologist places a wire into the breast to guide a surgeon to a suspected cancer (see arrow) so tissue can be obtained for study.

Specialists from various departments involved in the MGH Cancer Center meet weekly to discuss breast cancer patients and how to help them.

With today's techniques, physicians say, the risk of developing cancer from mammographic radiation is one chance in a million. A woman who has a spinal X ray receives the same amount of radiation through the breast as she would from a mammogram.

Work moves forward, nevertheless, to lower breast radiation levels further. The MGH Breast Imaging Section has been working closely with a local company whose experience in the development of X-ray detectors for satellite telescopes has led to a proposed new digital mammographic system.

The system would not rely on film to catch X rays and produce a shadow but, rather, on a solid state detector to count the X rays passing through. A computer would then construct the image. Such X-ray use would permit a lower radiation dose and open up new areas of investigation to further improve the early detection of cancer.

Dr. Kopans' department is also evaluating magnetic resonance imaging for breast tumor detection, taking advantage of MRI's ability to differentiate between fat and water structures. But much research lies ahead. Dr. Kopans sees a possibility that with refinements of MRI equipment "we may be able to tell benign from malignant with sufficient accuracy to avoid some of the biopsies we have to do now."

Lasers also intrigue radiologists. If a person stood in a dark room and placed a flashlight beam against the palm of a hand, the light would shine through the hand. The usefulness for cancer detection is questionable, however, since light rays do not travel in a straight line through human tissue but bounce and scatter. "If there's any light that will go straight through a breast, it most likely will be a form of low-energy laser light," Dr. Kopans said. "It's worth exploring."

The doctor said he knows of no other breast imaging unit in which a majority of the staff have expertise in all state-of-the-art means of breast evaluation: mammography, ultrasound, and CBT.

"We are one of the most experienced centers in the country in using preoperative localization techniques to guide a surgeon to an area in question," he said. "Furthermore, the procedures have evolved so that a patient does not have to be admitted for the biopsy but can be cared for as an outpatient."

Dr. Kopans added that "as partners in the MGH Cancer Center, we coordinate weekly multidisciplinary conferences with colleagues from other MGH departments to discuss diagnostic and treatment strategies.

"The Mass. General not only has the most up-to-date detection and diagnostic techniques but can also follow through with continuity of care, offering the patient whatever seems appropriate for her in terms of treatment should a cancer be detected. That is a major strength of this medical institution." ■

Unit Coordinator James Warakois explains to patients John Young of Weymouth, Mass., left, and Robert Porter of Portsmouth, N.H., how amateur radio operating can be an interesting diversion.

Amateur Radio: An Aid to Rehabilitation

"This is W 1 K R U. . . . Calling CQ CQ [to anyone on the air]. . . ."

After several moments, a voice came: "W 1 K R U . . . W 1 K R U . . . This is N 5 E S E, Dallas, Texas. Do you copy?"

"N 5 E S E . . . This is W 1 K R U in Boston," said James Warakois over a 150-watt shortwave radio. "I'm at the Massachusetts General Hospital. . . ."

As a casual conversation ensued, several individuals within earshot gathered around the radio equipment in a ninth-floor solarium in the hospital's White Building.

"We have a few patients here," Mr. Warakois informed his fellow ham operator. "I'm sure somebody would like to get in on this. Maybe Bob over here would like to say something."

Mr. Warakois, a Unit Coordinator at the hospital, passed the microphone to Bob who eagerly joined in the transmission. Then another patient had a turn. Then still another.

Since 1979 the scenario has repeated itself hundreds of times at the MGH. Patients on White-9—some hospitalized for lengthy periods—have communicated with radio operators in much of the United States, as well as in Canada, the Bahamas, and parts of Central and South America.

"The radio station not only provides a diversion for patients, helping them to wile away long hours, it also introduces them to an enjoyable method of maintaining and improving skills at socialization and communication," said Paula Beth Lutzin, an MGH Recreational Therapist.

Miss Lutzin encounters many older patients who are retired and have little to do when they return home; also, patients, such as people with a heart condition, who must adapt to a new life-style after discharge. For such individuals, she said, opportunities for self-directed leisure involvement and self-expression hold special importance.

Miss Lutzin recalled a radio conversation between several White-9 patients and a ham operator in the Midwest who was confined to his home following a stroke. Some of the patients were recovering from a similar condition. "The gentleman," she said, "told what it meant to him to be able to communicate with much of the world even though he could not leave his house."

One MGH patient was an avid amateur operator before being hurt in an accident. When he became a quadraplegic, he felt certain he would have to give up his avocation. But the hospital's Occupational Therapy Department adapted his home equipment for his continued use.

A number of MGH physicians hold amateur radio licenses. Dr. Allan H. Ropper, Director of the Neurological–Neurosurgical Intensive Care Unit, and Dr. Lawrence R. Wechsler, a Clinical and Research Fellow in Neurology, have conducted radio transmissions from White-9 with patients.

With his radio set at home, Dr. Ropper has communicated with many disabled people, including paraplegics who used the chin to operate a telegraph key. The blind and patients with speech-affecting illnesses, such as cerebral palsy, also employ Morse code effectively.

One of the most exciting recent advances in amateur radio enables the deaf to share in the pleasures of broadcasting. Inexpensive personal computers can be programmed to receive radioteletype messages and display them on a computer screen. The operator simply types his reply on the computer.

"Amateur radio is an especially fulfilling hobby for people who have disabilities of any kind," Dr. Ropper said. "In fact, a nationwide organization of ham operators called Handi-Hams is made up of disabled people. Most acquired their hobby after becoming handicapped."

The radio equipment need not involve a major investment. "Power has very little impact on how far you go," Dr. Ropper declared. "The nature of the antenna is the predominant factor."

In Boston, for example, the American Red Cross owns an antenna called an FM repeater, which is situated atop the Federal Reserve Bank building. Available for use by local amateurs, the antenna can pick up signals from very low-powered walkie-talkies and relay the transmission at a much greater power over a long distance.

"People from as far south as Providence, R.I., to as far north as Salem, N.H., and as far west as Holyoke, Mass., can communicate with each other using single-watt, hand-held walkie-talkies," Dr. Ropper said.

The idea of communicating by shortwave radio from a patient care floor at the MGH originated with an orthopedic patient, Robert Underwood, who initially was seen speaking into a walkie-talkie. Mr. Warakois, a former engineer with a commercial radio station in Boston, brought in another walkie-talkie and began a series of on-air conversations with Mr. Underwood.

In the belief that enough patients and hospital personnel would be interested in participating, Mr. Underwood volunteered to transfer a ham radio setup from his home to the hospital and operate it on White-9. Even after his discharge, he periodically returned with his equipment.

"At a later time, we would often run over to the Beacon Hill apartment of one of our surgical residents, who was also an

The Navajos Retain Old Ways of Life

During World War II, many American naval vessels plying the Pacific used a system of radio communications that continually baffled the Japanese.

Each vessel's crew included a Navajo Indian. When a message had to be broadcast, a Navajo aired it in his native tongue, and a tribal brother listened on another ship. Throughout the war, the Japanese struggled in vain to "break the code."

The Navajos' Athapascan language is unique to a handful of North American Indian tribes. Few other people have mastered it.

Fluency in the spoken word of their forefathers typifies the life-style of the Navajos who occupy the nation's largest Indian reservation.

Populated by more than 165,000 Navajos, the reservation—about the size of West Virginia—spills into parts of Utah, Colorado, Arizona, and New Mexico where these states converge.

Closely knit, the Navajos have never blended with western society. They prefer to remain on their reservation, adhering to traditional customs and beliefs and patterning their lives on tribal laws.

Last January, Dr. James J. O'Connell, then a third-year medical resident at the MGH, traveled to the reservation to work for more than a month at the U.S. Public Health Service Hospital at Shiprock, a town of some 25,000 about 90 miles north of Gallup, N.M. The hospital, one of nine operated in the Indian territory by the federal government, handles 50,000 patient visits annually.

"The Navajos are incredibly friendly and easy going," Dr. O'Connell said, "but most families live a half mile or more from each other. They would feel uncomfortable living closer."

The few communities that exist on the reservation developed around hospitals and trading posts. The territory also lacks industries. While the Navajos produce exquisite jewelry of silver and turquoise as well as elaborately designed blankets and rugs, these represent the handmade efforts of relatively few artisans and have little economic impact in the area.

Several years ago, a high tech company considered building a factory on the reservation. The firm erected modern housing for workers to be recruited from among the Navajos. Then, for some reason, the firm canceled its plans. The government bought the housing for the Indians, but few wanted to live there. Today, the buildings stand only a quarter occupied.

Although the Navajo tribe is financially well off, most of its families still make their homes in so-called "hogans." Once constructed of sticks and earth, these one-room dwellings now feature plywood and other modern building materials but still lack such standard conveniences as electricity, plumbing, and telephones.

Bone-numbing cold and deep snow plague the Navajos during the winter since most live at altitudes of more than 6,000 feet. Often settling in difficult-to-reach places in order to pursue their traditional occupations as sheep, cattle, or horse raisers, the Navajos must sometimes rely on their tribe and the federal Bureau of Indian Affairs for airdrops of food and other supplies.

In very severe weather, the Navajos simply stay in their hogans for as long as necessary, warmed by coal or wood fires.

"In general, they are a healthy and robust people," Dr. O'Connell said. "But high blood pressure is common—understandable in view of their stressful life-style—and we also see many instances of adult-onset diabetes.

"The entire time I was at Shiprock, however, I never encountered a Navajo who had a heart attack or peripheral vas-

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amateur operator, and borrow his set," Mr. Warakois said. "Sometimes the doctor, Jon Perlman, ran it. Sometimes I did.

"Regardless of who owned the set, we always used the call letters of the operator who held the highest-grade F.C.C. license."

Five years ago, the Ladies' Visiting Committee of the MGH provided funds to buy the hospital's present shortwave radio. At the same time, Mr. Warakois replaced a vertical, whip-like antenna that had been clamped to a railing outside the 12th floor of the White Building with a better system of transmitting and receiving signals.

He ran a horizontal wire, about 135 feet long, from an upper White floor to the roof of the hospital's nine-story Vincent–Burnham Building. A second wire, connected to the first at its midway point, extended to the White solarium for hookup with the radio.

"The change allowed us to operate on five frequency bands instead of just one or two," Mr. Warakois explained. "Our coverage area broadened tremendously, although we still can't reach such faraway places as Europe or Africa."

Miss Lutzin said that the hospital can only offer patients the opportunity to sample radio operating as one way to keep their minds active.

"We can only whet their appetites," she said. "They have to take it from there. We have found, however, that when people use their time productively, they don't tend to fall ill as frequently as others." ■

An elderly Navajo has a foot infection treated at the Shiprock Hospital.

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Accident Injuries Abound on Navajo Land

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cular [blood vessel] disease."

At the MGH, if a diabetic entered the Emergency Ward complaining of chest pain, the patient routinely received an electrocardiogram (EKG) to check for a possible heart attack. "Such a patient arrived in the Shiprock Emergency Room one night when I was on duty there," Dr. O'Connell recalled. "When I suggested an EKG, the nurses thought I was out of my mind."

One of the most common peripheral vascular problems encountered by physicians is an abdominal aortic aneurysm, an outpouching or ballooning on a wall of the body's main artery. A radiologist on the Shiprock hospital staff for close to 13 years told Dr. O'Connell that she had never seen a Navajo with that condition.

Over a five- or six-year period, the hospital has treated 32 Indian men for lung cancer. A study on the possible cause indicated that two dozen of the patients had worked in state-owned uranium mines either on or near the reservation. None of the Indians smoked. In fact, Navajos in general refrain from cigarettes.

Tuberculosis is relatively widespread on the reservation. Since TB requires 9 to 12 months of treatment, difficulty in reaching patients and seeing that they take their medicine can be a real challenge.

Dr. O'Connell expected to encounter considerable alcoholism among the Navajos. He did find it to be a serious problem but not the kind he anticipated.

"I was never called on to treat a patient for a condition directly resulting from the consumption of alcohol," he said. "However, there was a lot of binge drinking by younger Navajos who climbed into pickup trucks and traveled to bars outside the reservation. The Indians would get drunk and on driving back to the reservation, where alcohol was not allowed, they would become involved in accidents. We saw a staggering amount of trauma at Shiprock."

Frustration over lack of economic opportunities on the reservation accounts for much of the alcoholism among the young. "Some Navajos go on to college," Dr. O'Connell said, "but a surprising number gravitate back to their homes." The Indians most successful economically work either for a federal agency or for the tribal government, having authority virtually equal to that of the states.

The 70-bed Shiprock Hospital serves an area inhabited by 20,000 to 30,000 Navajos. The staff consists of a dozen doctors, including three surgeons, two internists, five family practitioners, and two obstetrician–gynecologists; also 50 full-time nurses, RNs or licensed practical nurses.

The Indians have great respect for modern medicine. They would not hesitate to drive 150 miles to the hospital to seek help for a child with a virus and a slight fever when all the patient really needs is aspirin.

Modern medicine even occupies a place in the very strong religious traditions of the Navajos. For example, they believe that spirits rule the universe with laws that may defy reason.

Dr. O'Connell told of treating a woman for an infection resulting from a gallbladder rupture. The Navajos attributed the affliction to the fact that the woman had entered her hogan after her husband had died there. Traditionally, the tribe seals the hogan permanently after a death.

To help cure the woman of her illness, a tribal medicine man repeatedly led a ceremony at the hospital, attended by the patient's family. One weekend, although she was still very sick, doctors even allowed her to return to her family compound and take part in a ritual there. She returned to the hospital the following Monday morning to continue her medical care.

The Navajos believe that even though their medicine men can right a transgression, the penalty—usually an illness—still requires the intervention of a doctor. ■

Navajo homes, or "hogans," are traditionally situated a considerable distance from the nearest neighbor.

MGH News

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Threat Increases From Unusual Strain of Hepatitis

On Treating Symptoms of Gout

Many Americans are taking medication for life to ward off the effects of gout—one of man's oldest recorded diseases—but an MGH specialist questions whether all of the patients really need treatment.

Dr. Dwight R. Robinson, a rheumatologist and member of the hospital's Arthritis Unit, estimates that up to seven times as many patients in this country are on gout-fighting drugs as may be warranted.

Sometimes described as the most painful type of arthritis, gout occurs after certain aspects of the body's chemistry malfunction and build up excessive uric acid in the blood (hyperuricemia). The acid, a waste material, converts into crystals of sodium urate (a salt). These then settle into a joint—most often that of a big toe—and induce an inflammatory reaction.

In a classic description of the disease, a 17th century British physician, Thomas Sydenham, compared the pain of gout to that of a dislocation. So exquisite is the feeling of the part affected, he wrote, that it cannot bear the weight of bedclothes or the jar of a person walking in the room.

Dr. Robinson said that for every one of an estimated one million Americans (95 percent male) known to have gout there are many patients with asymptomatic hyperuricemia.

"A great number receive treatment," he said, "even though blood uric acid can rise by a modest degree and persist at the higher level for decades without any symptoms developing. A variety of agents introduced to the body, including aspirin, can account for this elevation."

Uric acid results from a metabolic process involving purines, a substance both

(Continued on Page 4)

Alcohol has long been identified as a contributing factor in the cause of gout.

As medical researchers struggle to find a cure for AIDS, another mysterious virus is beginning to create concern.

The pattern of spread of this disease—labeled delta hepatitis—bears a striking resemblance to that of acquired immune deficiency syndrome.

Population shifts and human behavior account for much of the spread of each illness. High risks in both include drug addicts and hemophiliacs—people often exposed to needle inoculations or frequent transfusions of blood products.

Delta hepatitis relies for its existence on an intimate association with another virus that causes liver disease, hepatitis B. Since the annual attack rate of hepatitis B on susceptible homosexuals is between 10 and 15 percent each year, physicians have wondered why they have not detected the delta agent very often among gay men, the principal sufferers of AIDS.

"This picture is beginning to change," said Dr. Jules L. Dienstag, a liver specialist in the MGH Gastrointestinal Unit. "A growing number of delta patients has been reported among homosexuals in the Los Angeles area. Many doctors had felt that it was just a matter of time before this agent surfaced in the gay population.

"What worries us is that many gay men are chronically infected with hepatitis B; for the most part these 'carriers' have mild or no symptoms. A superimposed delta infection, however, could lead to acceleration of chronic liver disease or to fulminant hepatitis, which causes a massive destruction of liver cells."

Discovered only eight years ago, the delta virus has a unique hybrid structure: a core containing the genetic material RNA (ribonucleic acid) and a surface coating of hepatitis B. Being defective, delta cannot function by itself but must

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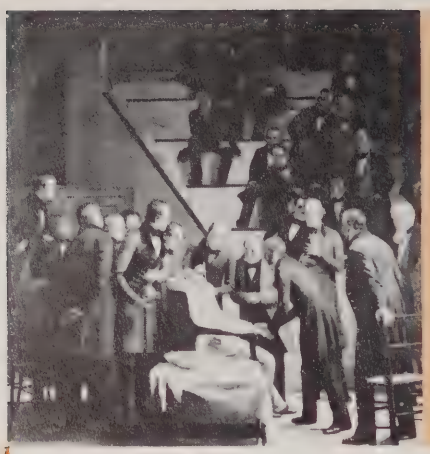

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EDITORIAL:

Reaching the Promised Land

In a Page 5 article, the MGH News *looks at the complex problem of malpractice. This month's editorial focuses on a much narrower aspect.*

It was not too many years ago that the physician was helpless in the face of diseases today considered curable or even preventable. And so he stood at the bedside and patted the patient on the shoulder. "We'll do our best," the doctor might say. But the best failed to help. Now physicians have wiped from the planet killers like smallpox. And medications like antibiotics so often win the struggle against bacteria. Newspapers herald "miracle" cures and describe "magic bullets" that promise to kill disease without harming healthy nearby tissue.

In the view of many lay people, American medicine is entering the promised land of CT scans, MRI, PET, cyclotrons, lasers and who knows what next. Those involved in the practice of medicine know better. CT, MRI, and PET all combined, as important as they are, fail to diagnose many problems. Cyclotrons beaming protons do not cure every ill, and lasers are still barely past infancy. Efforts to cure cancer work well in a high percentage of many types of early treated malignancies, far less well in others. In other words we may be approaching the promised land, but the reality of our technological limitations prevents many from entering.

What does this disparity mean to the ill? For the fortunate ones who have the "right" kind of cancer, the result often is a cure. At a certain stage of development, however, even the "right" kind of cancer is the wrong one. Faced with the certainty of an unhappy ending, some people look skyward and ask, "Why me?" Others ask themselves whether they should have had that growth "checked out" earlier. Some are philosophical. And some sue. At times clearly they should. If a plastic surgeon makes a longish nose look like Pinocchio's, there is cause for complaint and suit. But if the nose looks improved, yet the man fails to achieve his secret goal of resembling Robert Redford, then it is another matter. Thousands of malpractice suits arise from such unrealistic expectations. Many might smile uncharitably at the unfortunate patient whose daydreams are so bizarre. Far fewer smile though when the unrealistic belief involves, say, parents who sue an obstetrician who delivered a baby deformed by an inherited disease. Or the doctor whose patient died of an often curable problem. The difficulty is that each patient is unique. What helps most people with a given illness may sometimes have an adverse effect on someone else with the same disease.

In the final analysis both patients and physicians are humans subject to the same foibles and frailties that strike us all. When a physician makes an error that significantly harms a patient, that patient deserves reasonable compensation. If what the patient perceives as an error is really an unrealistic expectation that the art of medicine is an exact science, then a malpractice suit is unfair.

Delta Hepatitis

(Continued from Page 1)

strike either simultaneously with hepatitis B as a coinfection or be superimposed on underlying chronic hepatitis B infection.

Generally, physicians find it difficult to distinguish between hepatitis B and a coinfection. In either event, the illness usually runs its course. No specific treatment exists.

On the other hand, when chronic carriers suffer a superimposed infection, the tendency is for the condition to accelerate and worsen. "There is very little that we can do for these people," Dr. Dienstag said, "especially if they develop fulminant hepatitis. It carries a mortality rate as high as 80 percent."

A clear tie exists between chronic hepatitis B infections and liver cancer. But delta plays a small role, if any, in this. The hepatitis-cancer link is seen primarily in southeast Asia and Africa where people often acquire hepatitis B in early childhood. After several decades of infection, the frequency of liver cancer increases alarmingly. It is the most common cause of cancer deaths among males in Southeast Asia and Africa.

Delta's exclusion from the hepatitis-cancer association is explained by the fact that since delta frequently tends to induce relatively severe disease, patients die from that disease long before any cancer can develop.

An investigator at Turin in northern Italy, Dr. Mario Rizzetto, discovered the delta virus in 1977 while studying the livers of patients with chronic hepatitis B. He was analyzing the antigens, or proteins, of hepatitis B in liver cells and found that the nucleus of some of them contained an antigen different from B. Dr. Rizzetto labeled this material as the delta antigen, and an antibody found in the serum of these patients as the delta antibody.

Dr. Rizzetto came to the United States to pursue studies at the National Institutes of Health (N.I.H.). His work included the development of sensitive radioimmunoassay tests for the delta virus.

As the liver investigation progressed, it became clear that delta was heavily concentrated in Middle Eastern and Mediterranean countries. Also, the link between

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Photographs: Page 3, Myron Daniels; p. 4, courtesy of U. S. Bureau of Alcohol, Tobacco, and Firearms; p. 5, Don Robinson; p. 6, Chris Maynard; p. 8, MGH Photo Lab

Drawings: Pages 1, 7, MGH Medical Art

population shifts and spread of the virus became apparent. Dr. Rizzetto had thought that the disease had always been present in his home area, but evidence indicated that the organism had actually spread recently from southern Italy as people there migrated to the industrial north in search of better employment opportunities.

A study conducted in Sweden further emphasized the relevance of the effects of human behavior on the pattern of delta infection. The research showed that among drug addicts in that country who were chronic hepatitis B carriers, delta was absent in 1970, 1971, and 1972, then appeared in 1973. By the end of the decade, delta had spread throughout the susceptible population. More than three quarters of Sweden's carrier-addicts were affected, and episodes of delta hepatitis also began to appear outside the drug community.

With tests to diagnose delta, investigators restudied a number of hepatitis outbreaks in isolated populations which had resulted in a heavy loss of life.

Between 1979 and 1981, hepatitis B broke out among the Yucpa Indians, a tribe living in a remote mountainous area of western Venezuela. With the cooperation of that government, representatives from N.I.H. and the federal Centers for Disease Control visited the area, reexamined laboratory specimens and data, and verified that delta had been present in the illness.

Furthermore, of 21 Yucpa villages, only 3 were involved. The hepatitis B chronic carrier rate among the Yucpas was about 10 percent, but, in the villages hit, only 3 percent of the population was found to carry the virus after the outbreak. Presumably delta had wiped out the other approximately 7 percent.

Studies also revealed that delta figured as long as a generation ago in severe hepatitis among Brazilians living in the Amazon Basin and as long ago as the early 1900s in outbreaks that struck mountain villages of Colombia.

Evidence points to the delta virus in the United States as early as the mid 1940s. In their retrospective probe, the N.I.H. investigators tested supplies of infection-fighting gamma globulin prepared toward the end of World War II from plasma collected from military donors. The gamma globulin was found to contain antibodies to the delta virus.

At the MGH, specialists in the Gastrointestinal Unit retested stored serum samples obtained over the past decade from patients who had suffered from hepatitis B. The results indicated that delta virus contributed to the illness in 20 to 30 percent of the patients with the more severe outcomes of hepatitis B.

Using a spectrophotometer, Research Technician Carolyn Hinkle analyzes serum samples for the presence of hepatitis antigens and antibodies. Dr. Jules Dienstag records results.

Since September 1983, health officials have kept a close watch on an increase in the hepatitis B frequency in the Worcester, Mass., area. Ten deaths have occurred among 240 patients. Delta figured in most of the illnesses.

"There is a major difference between the Worcester outbreak and those in South America," said Dr. Dienstag, who is also Associate Professor of Medicine at Harvard Medical School. "South of the border, most of the occurrences were new delta infections superimposed on chronic hepatitis B, while in Worcester the bulk of the patients suffered acute simultaneous hepatitis B and delta infections.

In the MGH Blood Transfusion Service, Technician Rae Ishee stores newly donated blood to await a precautionary check for hepatitis.

"What is worrisome is that, in addition to the numbers of patients, we are observing unusual severity in a form of disease which normally resolves itself. We don't understand why the death toll is so high. We're very concerned."

Efforts to develop an effective treatment against delta hepatitis are accelerating. "There's some evidence from N.I.H. and a group in England which suggests that the drug interferon can hamper the ability of the delta hepatitis agent to cause liver injury," Dr. Dienstag said, but he added, "The results are still preliminary."

In a *New England Journal of Medicine* editorial coauthored with Dr. Norman S. Nishioka, a Fellow in the MGH Gastrointestinal Unit, Dr. Dienstag wrote:

"Although delta hepatitis can be prevented by vaccinating susceptible persons with hepatitis B vaccine, unfortunately no simple method exists to protect hepatitis B carriers from delta superinfection.

"What will happen if delta is introduced into such hitherto spared groups with high frequencies of chronic hepatitis B as homosexual men or, as appears inevitable in today's world of global travel, Asian populations? Unless additional, intensive investigation of this novel agent and its properties provides clues to its control, we may be confronted with a new scourge." ■

Drugs Eliminate Suffering From Gout

(Continued from Page 1)

present in food and manufactured by the body. Purines are precursors of nucleic acids, vital components of all living cells. In the chemical changeover which leaves uric acid as an end product, the body normally disposes of the acid through urine.

Biochemical errors can lead to an overproduction of uric acid, but a much more frequent cause of excess buildup is inability of a person's kidneys to efficiently excrete the material.

Some practitioners have long felt that if they allowed hyperuricemia to go untreated, kidney damage could result.

"It is quite clear today," Dr. Robinson said, "that hyperuricemia by itself does not damage the kidney unless acid overproduction leads to formation of kidney stones, which is uncommon."

In that event, treatment to reduce the uric acid output is warranted. Also, the doctor said, drugs may be called for if the rise of uric acid, particularly in a younger or middle-aged person, has reached a degree where gout is clearly inevitable. And treatment would be justified if even a modest increase in acid precipitated repeated gout attacks.

In the mid 1700s, physicians began fighting gout with a drug called colchicine (made from parts of the autumn crocus). Colchicine proved highly effective in stopping gout attacks by impairing the ability of scavenger cells to ingest the sodium urate crystals. That aborted the inflammatory reaction.

Colchicine is still used today to curb attacks, but because of potentially distressing side effects, such as acute gastrointestinal (G.I.) upsets with cramps and diarrhea, most physicians prefer to prescribe one of several nonsteroidal, anti-inflammatory drugs, e.g., indomethacin or ibuprofen.

"I would guess that more than 90 percent of all acute attacks of gout are treated with one of these nonsteroidal, anti-inflammatory agents," said Dr. Robinson, who is also Associate Professor of Medicine at Harvard Medical School.

In two situations, colchicine probably remains a drug of choice. Hospitalized patients who suffer gout attacks during complex illnesses may be unable to take oral medications. Colchicine could be given intravenously and in that way would rarely, if ever, have a G.I. toxicity.

The drug, for some reason, also offers little, if any, benefit against other forms of arthritis. Doctors, therefore, sometimes turn to this medication to confirm a diagnosis of gout.

Three other drugs also play primary roles in combatting the disease, specifically in preventing future attacks. Allopurinol inhibits the formation of uric acid by interfering with an enzyme (xanthine oxidase) which figures in purine metabolism. Probenecid and sulfinpyrazone increase the efficiency of the kidneys in excreting uric acid by preventing its reabsorption while traveling through that organ.

Normally lasting from a few days to a few weeks, gout attacks may occur years apart, but in some patients they have increased until virtually superimposed on each other. This chronic "tophaceous" gout, which the condition is called, can be as devastating as very severe rheumatoid arthritis.

"Gout is not a technically curable disease," Dr. Robinson said, "because even if successfully treated patients retain an underlying tendency toward the illness. But there is no reason why anyone today has to suffer from gout. Almost every patient responds dramatically to appropriate treatment."

The doctor did caution, however, that it might require six months to dissolve all of the accumulated deposits of sodium urate crystals. "But once that is achieved," he said, "the patient should be able to go through life without any new problems from gout."

Dating from the ancient Greeks and Romans, gout picked up a reputation as a disease of the wealthy because rich foods and alcoholic beverages—signs of high living—contribute to the disorder. Galen, the celebrated Greek physician, physiologist, and anatomist, once ascribed gout to "debauchery, intemperance, and a hereditary taint."

Studies have confirmed that obesity and alcohol can both increase uric acid production and impair excretion by the kidneys.

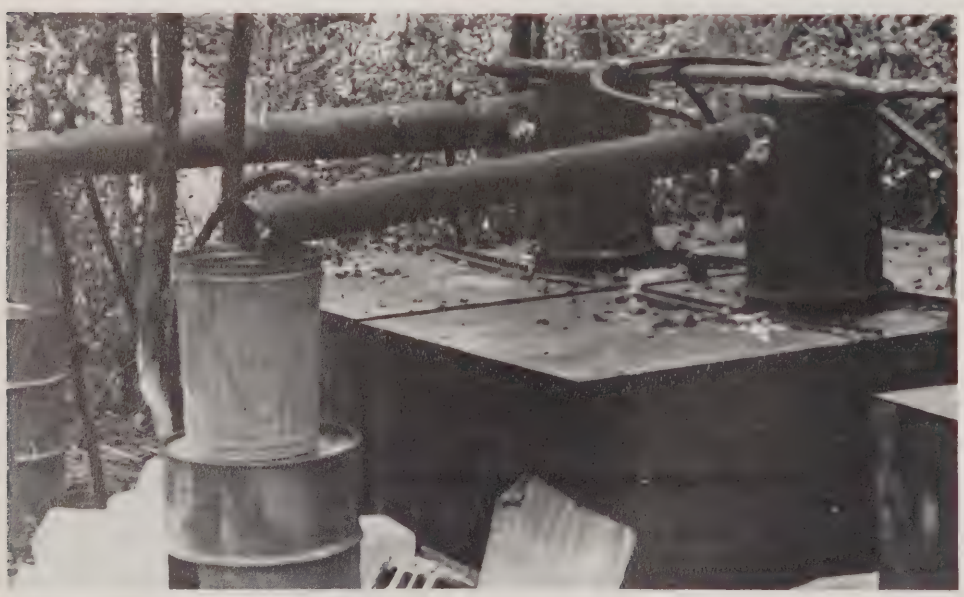
Toward the end of the 18th century, reduced tariffs prompted shipments to England of large quantities of Portuguese wine in lead-lined barrels. When an outbreak of gout occurred, many of the patients, it turned out, had imbibed the expensive wine, thus reinforcing the belief that the illness afflicted mainly the well-to-do.

What had actually occurred was that the lead had permeated the wine and then poisoned the kidneys of those who drank it. With the kidneys prevented from excreting uric acid, crystal deposits built up, and episodes of gout followed.

Within the past two decades, the finger of guilt pointed again to lead in studies conducted in parts of America's South. Dr. William Kelley, then Director of Rheumatology at Duke University, studied moonshine whiskey seized by police in raids on illegal stills and even went to the sites to inspect the equipment.

He found that lead weldings in radiators used in the stills had contaminated the whiskey and that a significant percentage of gout in the South was associated with drinking moonshine.

One of the most common questions on gout is: Why does it single out the big toe? Nobody really knows the answer, but Dr. Robinson offered this theory:



A high incidence of gout in parts of the South was traced to moonshine whiskey contaminated by lead from tank linings in the illegal stills.

Rising Malpractice Claims Alarm Doctors

Twenty years ago, when a physician delivered a baby who turned out to be less than perfect, the development was considered an act of God.

"Today there are no more acts of God," a veteran obstetrician observed. "Parents feel that you should have been able to do something."

Medical malpractice claims in this country have tripled in the last 10 years with obstetricians, neurosurgeons, and orthopedists the prime targets for lawsuits. Plaintiffs have won record settlements, especially when the cases involved babies.

While priding itself on offering the best medical care in the world, the United States at the same time is trying to cope with the world's highest medical liability claim rate.

A special task force of the American Medical Association (A.M.A) found that in 1983 a total of 16 claims were filed for every 100 doctors. Average settlements, less than $5,000 in 1979, now exceed $330,000.

In their study, the A.M.A. investigators described medicine as a complex, rapidly changing, inexact science and pointed out that patients' needs, medical histories, and responsiveness to treatment vary greatly. "Many claims," they said, "involve no negligence at all, only unfulfilled expectations."

A Boston lawyer, who manages medical liability insurance programs covering some 30,000 physicians in 10 states, agrees.

"No one is free from the specter of malpractice," said James M. Vaccarino, Vice-President of Johnson and Higgins Company, a leading insurance brokerage firm, and former director of legal affairs at the MGH. "The question of who is likely to be sued does not revolve around who is more apt to be negligent as much as who fails to meet the expectations of patients.

"The magnitude and complexity of activities in which doctors are engaged today—including the evolution of equipment and staffs to facilitate the practice of medicine—have forced physicians to become very business oriented in their relationship with patients.

"The system has created a suspicious and more demanding public. A sick individual wants personal attention and compassion. Failure of some doctors to provide this compassionate sensitivity fuels the challenge to medicine and leads to a

greater frequency of claims. Since even a frivolous claim must be acted upon, the physicians' financial burden grows."

In Massachusetts, a panel comprised of a doctor, lawyer, and judge screens malpractice claims and drops almost half as being frivolous. However, by posting a bond, a plaintiff, rejected in a screening, can still pursue court action. The bond covers costs if the plaintiff loses again.

Of cases which go to trial, lawyers state that only about 30 percent result in awards for plaintiffs. Nevertheless, the cost of malpractice insurance increases; in Massachusetts, premiums have risen 400 percent in five years.

Bay State physicians pay an average $6,700 a year for malpractice coverage. Those in high-risk specialties, such as neurosurgery, are charged as much as $17,000.

The Supreme Judicial Court in Massachusetts, however, has ruled these rates inadequate and has ordered new ones. Specialists fear that their new insurance bills, including payments making up for earlier undercharges, may range anywhere from $50,000 to $80,000.

In Massachusetts, doctors cannot recover insurance costs by passing the charges on to their patients.

Physicians have expressed concern that if the insuring crisis continues unchecked, very few of the best qualified specialists will want to stay in the state. Most, they feel, will look for places to practice where the regulatory climate is less stringent.

Such places are becoming more difficult to find. In New York and Florida, malpractice premiums for some specialties have soared past $100,000. In upstate New York, obstetricians, neurosurgeons, and orthopedic surgeons are increasingly avoiding care of high-risk patients to reduce the possibility of a lawsuit. In response, the state's health department established an emergency patient referral service to assure doctor availability.

With insurance costs rising some 22 percent a year in their states, a third of the obstetricians in Florida and a quarter of those in California have stopped delivering babies.

When malpractice suits first began multiplying alarmingly in the mid 1970s and million dollar verdicts became commonplace, insurance companies fled the medical scene in droves, leaving doctors the option of paying skyrocketing premiums or "going bare" (practicing without insurance protection).

Many physicians began practicing defensive medicine, ordering extra tests and procedures so that if a patient's condition became worse no one could say that not enough had been done.

(Continued on Page 6)

"The toe is a peripheral part of the body, and its blood circulation is not as good as the circulation elsewhere. The temperature in the toe tends to be lower than in other parts. Low temperatures are conducive to the precipitation of uric acid crystals whereas a warm temperature would tend to dissolve them."

Although each acute attack usually involves a single joint, development of gout in more than one joint simultaneously is not uncommon. About a dozen years ago, a review of records in the MGH Arthritis Unit revealed more than 100 patients having acute attacks with multiple joint involvement.

"The disease can affect various parts of the body but has a predilection for joints in the lower extremities," Dr. Robinson said. "If a patient has recurrent attacks of arthritis without a lower extremity being affected, then the diagnosis usually is something other than gout." ■

States Review Medical Malpractice Laws

(Continued from Page 5)

Countless self-insured medical groups also sprang up, including so-called Joint Underwriting Associations (J.U.A.s) established by individual states.

In one action, 11 teaching hospitals affiliated with Harvard Medical School, including the MGH, formed their own insurance firm, the Controlled Risk Insurance Company (CRICO).

The members complained that their former insurers charged the same rate regardless of whether physicians were good or poor risks. In the previous five years, the Harvard group had been assessed only $250,000 in damages, yet had paid $8 million in premiums, the experience of many insureds in the mid 70s. During the first year under their own malpractice insuring plan, the Harvard people reaped substantial savings in premiums.

Whereas the J.U.A. in Massachusetts, covering a majority of the state's 17,000 doctors, offers insurance on an "occurrence" basis, CRICO operates under a modified "claims-made" plan.

The principal difference is that an occurrence policy protects the buyer forever on any claims arising from a time when he was insured. A claims-made policy provides only year-long protection. If a physician with a claims-made policy retires or leaves the state, he must obtain "tail" coverage to be insured against delayed claims.

"CRICO believes that its plan is more prudent from a business sense," said Mr. Vaccarino. "Its people know at the end of the year what their liability is, and they can fund for it. The worst situation that can develop would be a one-year deficit whereas with the occurrence program one has to look years ahead and guess the kind of money that will be needed to pay losses based on premiums received this year."

Some states have modified statutes of limitations on filing malpractice claims. For example, where a law once established a claims deadline as two or three years from the date of incident, the statute may now stipulate two or three years from the date of discovery, which can be far into the future.

Legislators in some 30 states have moved for major malpractice insurance reforms. Among the most controversial are demands to limit or "cap" awards.

At least a dozen states have imposed caps. Some affect only damages for pain and suffering, but some also restrict compensation for financial loss. Several states rejected caps, claiming they arbitrarily limit the rights of plaintiffs.

Nearly two dozen states have imposed restrictions on the contingency fees of plaintiffs' attorneys. Under a bill filed in Massachusetts, lawyers would collect only one-third of the first $50,000 awarded; the higher the award, the smaller the percentage of the fee.

Other Massachusetts legislation seeks a tightening of rules on the introduction of expert testimony in malpractice cases, admission of evidence on whether plaintiffs have any personal injury insurance policies, and an earlier deadline on filing claims.

The issue of medical testimony has long generated acrid debate. Plaintiffs' attorneys often complain that they cannot find local medical experts willing to testify in malpractice cases and must reach out of state to obtain the witnesses. Defense attorneys sometimes label these witnesses as "hired guns" whose expertise does not always measure up to what is expected.

Dr. Andrew G. Bodnar, Assistant Chief of Cardiology at the MGH who is also an attorney, believes medical societies or specialty groups should make experts available but with an understanding that each side in a case must respect the views of these doctors and not search for other specialists if the opinions prove adverse.

Dr. Bodnar stressed, however, that the various proposed tort reforms strive to fine-tune a system which perhaps society in general no longer wants.

"Traditionally in Anglo-American tort, everything has focused on fault," the doctor said. "If there was no fault, there was no compensation, regardless of what harm occurred. As society has become more complex, the focus appears to have shifted away from fault. The feeling now seems to be that perhaps there should be compensation on the issue of harm alone."

Opponents argue that a no-fault system would lead to settlements on such a wide scale that the cost would be even more overwhelming than now. But Dr. Bodnar counters:

"No-fault would probably do away with damages for pain and suffering, which comprise a large portion of most settlements and trial findings. You would be free to create compensation categories and awards, perhaps even to rule out compensation for certain things, saying that that is a risk of being a patient in today's complex medical society."

Dr. Bodnar said no-fault would assure speedy payments to claims makers who otherwise would find the legal process very slow moving. Insurance companies could be mandated to offer a settlement within a specific time.

At least one proposal has been made which would link arbitration with a no-fault system. Under the plan, the insurers would have to offer a settlement within six months, and if the patient declined, the matter would automatically go to arbitration. Court action would be reserved only for situations in which criminal negligence was alleged.

Many people believe the specter of legal action forces physicians to practice good medicine. "That has never been

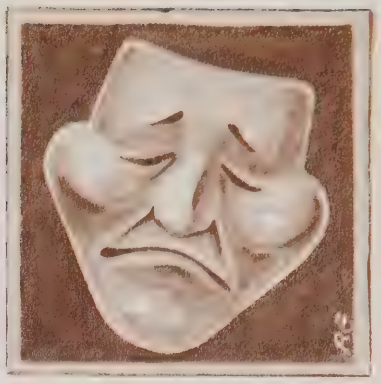
shown to be a factor," said Dr. Bodnar, "but we do need to keep an eye on our own profession." He urged increased staffing and funding for the Massachusetts Board of Registration and Discipline in Medicine so it can effectively weed out poor doctors.

And the MGH cardiologist–attorney underlined the importance of the doctor–patient relationship.

"The more legal requirements are waved at the medical profession, the less informative doctors are in talking to their patients," he said. "The necessity to read to a patient a list of possible complications in connection with a proposed medical procedure immediately creates a difficult atmosphere for all concerned.

"Patients have every right to ask the doctor to explain what he plans to do and what alternatives there are. It is the patient who must ultimately decide about his own future. But the faith and trust upon which the doctor–patient relationship has traditionally been built must not be weakened. The patient must continue to view their communication as part of a healthy and vital exchange rather than as something dictated by law." ■

Avoiding Stage Fright By Curbing Anxiety



Preparing for a concert, a well-known pianist undertook a rigorous daily practice schedule that left him mentally and physically weary.

Resolved to perform magnificently, he practiced with increasing fervor as the concert date neared. The accolades he later received for his playing compensated well for the time, devotion, and energy that went into the preparation.

Another pianist, as prominent as the first, stopped playing for several years and then attempted a comeback but found that the layoff had produced extreme anxiety.

At the keyboard, his heart raced, blood pressure rose, fingers stiffened, and concentration diminished. He had to delay his comeback while a specialist treated him for performance anxiety, or stage fright.

The examples of the two artists help to illustrate what psychiatrists and psychologists describe as the inverted U-curve phenomenon.

The challenge of appearing before an audience and being judged produces anxiety in everybody. The degree of apprehension is the key. Studies have shown that a moderate rise (the first part of an inverted U) frequently enhances one's ability and improves efficiency. Consider a losing football team exhorted by the coach at half time to "get out there and play harder." Often the pep talk motivates the team to play better.

The inverted curve reaches a peak when the anxiety levels and physical symptoms no longer lead to improved efficiency but start to cause a deterioration of performance (the curve's downside).

"The high point varies with each individual," said Dr. Patricia S. Normand, a Clinical Fellow in Psychiatry at the MGH and Harvard Medical School. She cited a study in which people were given the stress hormone epinephrine and then placed in a challenging situation. "Although the challenge induced a similar level of arousal in each participant," she said, "some described it as anger, others as euphoria."

The body's hormonal reaction to rising anxiety is commonly characterized as a fight-or-flight response geared to precipitate an action, either to cope with a situation or to escape from one.

On recognizing danger, for example, the brain signals the adrenal gland to produce more epinephrine. The hormone speeds the heartbeat, sends more blood to skeletal muscles to permit a fast run, steps up the release of glucose for energy, and dilates the eyes to sharpen vision.

Performance anxiety, or stage fright, is believed to be a variant of the fight-or-flight response since they present virtually identical symptoms.

Doctors classify performance anxiety as a social phobia. Such patients fear that they will incur shame if they expose themselves to the scrutiny of others. Social phobias encompass not only performing but also such common activities as eating in a restaurant, writing in the presence of others, and using a public restroom.

People who are phobic commonly try to deal with their affliction by avoiding anxiety-producing situations, but that does not cure the problem.

Dr. Normand recalled a 22-year-old business school major who was an excellent student but dropped a course important to her planned career because she feared a failing grade. The course required oral presentations. Several days before a scheduled talk, the young woman would begin to get nervous. On the appointed day as she rose to speak, she would shake, sweat, blush, and have difficulty remembering what she wanted to say.

The doctor prescribed propranolol, a beta-blocking drug which slows the heart rate, lowers blood pressure, and decreases the heart's need for oxygen. Enrolled in a new class, when the student got up to speak, she still felt nervous but no longer exhibited the outward symptoms. Confident that her teacher and classmates would not detect her concern, the student completed her talk successfully.

Dr. Normand said that to provide benefits propranolol need be taken only one and a half to two hours before a planned event. Taking the medicine on that basis rather than on a regular schedule minimizes the likelihood of side effects.

Some people strive to overcome stage fright by using a class of tranquilizing drugs called benzodiazepines. Diazepam (Valium) is one such medication. In an article printed in the May issue of the publication *Drug Therapy,* Dr. Normand wrote:

"Some studies indicate that benzodiazepines are superior to beta blockers for the treatment of chronic anxiety states. However, this does not seem to be true for acute performance anxiety.

"Although benzodiazepines decrease anxiety in the performance setting, they

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Behavior Modification Can Control Anxiety

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have been noted to cause musicians to lose self-objectivity during a performance. The effect of these drugs on motor skills, which may decrease manual dexterity, is an additional concern for instrumentalists."

While some health professionals lean toward drugs to treat stage fright, others rely on behavior therapy.

Lee Baer, Ph.D., an MGH Clinical Psychologist and Instructor in Psychology at Harvard Medical School, specializes in behavior therapy. He describes desensitization, a technique developed in the late 1950s, as being useful in treating virtually any phobia to a specific situation or object.

"The patient is taught to relax deeply and then imagine being in situations of gradually increasing anxiety," he said. "By having such images while relaxed, the individual in effect causes the stressful events to lose their anxiety-producing capability."

More recently, people have been taught how to carry this anxiety decrease into real-life experiences. Using methods such as controlled breathing and muscle relaxation, a patient learns to handle stress while actually performing. At first the therapist may be an audience of one. Then a few more people are invited. The technique is called in-vivo (real life) desensitization.

Another method of combatting stage fright is imaginal flooding. This involves imagining a situation in its most frightful form. If a pianist fears appearing before even a small group of people, he would be urged to imagine himself playing in a jam-packed Carnegie Hall and being televised worldwide. After reaching a peak, the anxiety slowly subsides.

Several studies have shown that people in stage fright situations often have self-deprecating thoughts, e.g., "I'm not doing well in my talk," or "I don't deserve to be up here." This is where cognitive therapy can help. To avoid anxiety, the individual is instructed to think sensible and positive-type thoughts while performing.

If a patient is a good hypnotic subject, the therapist may use hypnosis to decrease the person's fight-or-flight response.

Meditation can serve the same purpose. By having a patient concentrate on a word, perhaps saying it over and over to himself, other thoughts, which could be anxiety producing, are allowed to just pass harmlessly through the mind.

Excessive anxiety while preparing for a public appearance threatens to reduce the quality of the performance.

In the past, drugs and behavior therapy have generally played independent roles in the treatment of stage fright. Drs. Normand and Baer are beginning a collaboration through the MGH Psychopharmacology Clinic in which they hope to demonstrate a value in combining such treatments.

There will still be particularly complex patients, however, such as a professor Dr. Baer knows who throws up before every class but nevertheless goes on to deliver admirable lectures. The professor is convinced that when he stops throwing up, that's when he'll have something to worry about. ■

Staying Cool

Drs. Patricia Normand and Lee Baer of the MGH Psychiatry Service offer this self-help advice to people prone to stage fright:

- Avoid alcohol as a means of relieving tension.
- Don't drink anything with caffeine, such as coffee, before a performance. Caffeine can stimulate anxiety.
- Nicotine in tobacco can have the same effect; so don't smoke.
- Rehearse a planned talk in front of close friends. Not only may they offer advice to improve the presentation but just the transition from notes to uttering the words can help reduce anxiety.
- To promote relaxation, let the diaphragm assist more in the breathing process. Diaphragmatic breathing occurs naturally in sleep.
- And do not deal with an anxiety-provoking situation by shying away from it because if the circumstance ever recurs, the fears surely will too. ■

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 8 November, 1985

A New Battle Gets Under Way to Prevent Strokes

MGH Families Unwind at Halcyon Place

In 1960 when Dr. Nathan B. Talbot began a 17-year tenure as Chief of the MGH Children's Service, one of his first acts was to cancel formal visiting hours.

He encouraged parents of sick children to visit them at any hour of the day or night and to stay as long as desired.

"Dr. Talbot recognized that parents are so important at every stage of everything we do," said Dr. John T. Truman, Chief of the hospital's Pediatric Hematology–Oncology Unit. "Parents who exhibit optimism, enthusiasm, and energy often imbue their ailing youngsters with those qualities."

Oblivious to time, countless mothers and fathers have taken turns around-the-clock at the bedside of young MGH patients, napping on cots, couches, or chairs. Far from complaining about crowded conditions, nurses found the families' presence a tremendous help. The parents frequently assumed minor chores that freed the staff for more important duties.

Time takes it toll, however. It became evident long ago that visiting parents who were far from home needed a place where they could recharge both their physical and emotional batteries.

Most could ill afford hotel costs since even after discharge from the hospital most patients must visit a clinic frequently, sometimes daily, for further treatment of such illnesses as cancer or heart, lung, or kidney disease.

Six months ago, the problem was solved with the birth of Halcyon Place.

A four-story brick townhouse at the foot of Boston's Commonwealth Avenue, within walking distance of the MGH,

(Continued on Page 4)

Halcyon Place offers inexpensive accommodations in a warm and caring atmosphere to families of MGH patients.

In the past 15 years, deaths from stroke in the United States have declined 45 percent due largely to improved control of high blood pressure.

But stroke—the result of a blockage or rupture of an artery in the brain—is still the nation's third leading killer, after heart disease and cancer.

At the MGH, a team of specialists from several departments has just launched a five-year, $1 million research effort to further decrease the threat of stroke.

In a new approach, the investigators are assessing anticlotting (anticoagulant) therapy for patients with a heart condition known as atrial fibrillation (AF). Comprising the study team are members of the General Medicine Unit, the Neurology Service, the Cardiac Unit, the Medical Practices Evaluation Unit, and the Laboratory of Computer Science.

Although hypertension contributes heavily to the 500,000 strokes recorded in this country each year, AF is associated with 75,000 strokes (15 percent).

Atrial fibrillation refers to a disorder of normal electrical impulses in the upper chambers, or atria, of the heart. Just as timing is crucial to the smooth operation of an automobile engine, so must the rhythm of the heartbeat stay uniform to assure an effective pumping of blood.

During fibrillation, or irregular beating, blood in the atria tends to pool and stagnate. Clotting often follows. Later a clot, or part of one, may tear free from the heart and travel through arteries to shut off a vessel in the brain. The severity of the stroke depends on where the blockage occurs.

With funding from the National Heart, Lung, and Blood Institute, the research program calls for participation by 350 AF patients, half to receive the commonly

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EDITORIAL:

After a Struggle, A Truly Halcyon Place

Merriam-Webster's Third International Dictionary defines halcyon as pleasingly or idyllically calm or peaceful.

Halcyon Place is the name of a large red-brick house that has become an oasis for families who need quiet. The honor roll of people who have assisted with the difficult birth is long. The names of some appear in a page 1 article. For two of them the realization of a dream is particularly sweet. Sheila Brown and Barbara Dillon conceived of a home where pediatric patients and their parents, who resided away from Greater Boston, could stay inexpensively. It was to provide an oasis away from the crowded bustle of the MGH's Burnham Building for children.

The dream came nearly a decade ago. Gestation always takes much longer than conception. First came approval of the concept itself. That was easy. Then came the trudging up and down "the wrong side" of Beacon Hill looking at dreary houses that would have better spread their gloom along the seamy side of Dickens' London. No cheer there. Mrs. Dillon and Mrs. Brown could probably have taken an easier course had they opted for a commercial venture. Less determined dreamers would have abandoned their vision.

Here, there is neither space nor need to detail their odyssey. The availability of 27 Commonwealth Avenue was the ultimate prize. For years the handsome house had served as a residence for MGH dietitian interns. Now it became the culmination of the dream.

The day that Halcyon Place opened, the magnolia trees were blooming on Commonwealth Avenue. A stream of guests entered Halcyon Place in rivulets. The spring sun burst through the bay windows, providing warmth and light for a television crew moving among the guests. Necks craned upward at the lofty ceilings. Eyes paused at architectural details and then moved on. Knots of guests climbed the handsome stairway to view the bedrooms. Soon families of pediatric patients and adult patients too would be calling those bedrooms home. The kitchen would become an oasis within the oasis. Pleasant aromas blending a United Nations of cuisines would waft through the house summoning men, women, and children—hungry for food and companionship. The sound of children's voices, happy and relaxed, would punctuate the chatter of adults conversing in a babble of tongues. And the near decade of a dream which glowed even in the darkest moments finally became reality. The long struggle was worthwhile.

Strokes

(Continued from Page 1)

used anticoagulant drug warfarin (Coumadin) and the remainder to serve as a control group given customary care. Averaging 65 years of age, all will be followed for three years.

A staggering of admissions to the program—150 patients the first year and 100 in each of the next two—will carry the study through mid 1990.

In the event the MGH cannot provide a sufficient number of patients qualified for enrollment in the study, at least a dozen other medical centers in Massachusetts and New Hampshire stand ready to assist in the recruitment.

Prior to receipt of the federal grant, the Eliot B. and Edith C. Shoolman Fund provided the essential financial assistance to organize the project. The fund's administrator, Dr. John D. Stoeckle, Chief of the MGH Medical Clinics, said Mr. and Mrs. Shoolman established a generous endowment last year to support care, teaching, and research in all aspects of cerebrovascular disease.

In addition, Louise Schnell, a neurology patient, has provided financial support for the AF program.

Physicians have used warfarin with remarkable results in treating patients with AF associated with rheumatic heart disease and a narrowing (stenosis) of the mitral valve. This group represents 10 to 15 percent of all AF patients.

The mitral valve allows newly oxygenated blood to flow from the left atrium to the heart's left ventricle, or pumping chamber, to be recirculated through the body. AF reduces the push of blood into that ventricle.

"Prior to the use of warfarin, over their lifetime as many as 30 to 40 percent of rheumatic valvular patients suffered a cerebral embolism [a blood clot blocking a brain artery]," said Dr. Robert A. Hughes, Director of the MGH's Anticoagulant Therapy Unit (ATU). "Today, thanks to warfarin, that figure is down to somewhere between 5 and 10 percent."

Basically, almost any abnormality that can alter the structural integrity of the heart has the potential to produce atrial fibrillation and increase the risk of stroke. This was not generally appreciated until 1978 when an MGH group, comprised of

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Photographs: Myron Daniels

Drawing: Page 6, courtesy of Dr. David G. McLone, Northwestern University

Dr. Robert Hughes examines Louis Campanaro of East Boston in the Anticoagulant Therapy Unit.

Drs. Richard C. Hinton, J. Philip Kistler, John T. Fallon, Allan L. Friedlich, Jr., and C. Miller Fisher, published the results of postmortem research they conducted on patients diagnosed as having AF.

Physicians had believed that AF leading to a stroke resulted primarily from rheumatic valvular disorders. The MGH group found that the incidence of stroke from AF brought on by other heart conditions also was high.

Dr. Hughes said that in this second group 25 to 30 percent of patients with AF developed a stroke over their lifetime. "We believe," he said, "that the percentage of stroke patients in this general category can be lowered to under 5 percent with the anticoagulant."

Just as there are benefits of anticoagulant therapy, there are risks involved in using that type of drug.

"Anticoagulants such as warfarin also increase the chance of having abnormal bleeding," said Dr. Kistler, an MGH neurologist who directs the hospital's Stroke Service.

"For the group on warfarin, the annual risk of bleeding serious enough to necessitate hospital admission is variable, ranging from 10 percent to as low as 2 percent in tightly controlled patients in this hospital. This threat would be balanced to a considerable extent by the presumed greater risk of blood clots forming in the group not receiving an anticoagulant."

Drs. Kistler and Hughes serve as co-principal investigators of the MGH study. Dr. Daniel E. Singer, Director of Clinical Epidemiology Research in the General Medicine Unit, has been chiefly responsible for issues of study design.

Other team physicians include Drs. Fisher and Gregory Call of Neurology and Drs. George E. Thibault, Assistant MGH Chief of Medicine, and Howard C. Herrmann of the Cardiac Unit.

Bernard A. Rosner, Ph.D., of the Department of Statistics at Harvard University, will serve as consultant to the project on design and statistical analysis.

Mary A. Sheehan, RN, has transferred from the Phillips House Coronary Care Unit to lead the team of nurses involved in the study, including Maureen Welch, RN, and Lynn Oertel, RN. Ellen McGrath, secretary of the ATU, will serve as administrative assistant for the program.

To lessen the chances of abnormal bleeding during the study, physicians are prescribing the drug in reduced doses. Normally, the time it takes for blood to begin clotting (the prothrombin time) is 12 seconds. Traditional anticoagulation seeks to prolong the time to approximately 20 to 22 seconds. In the MGH program, the prothrombin time will be 16 to 18 seconds.

Atrial fibrillation varies widely in its characteristics. In some patients, the condition is intermittent, alternating with a normal sinus rhythm. Other individuals endure a sustained AF for years without a problem.

"Patients with sustained AF probably are at a higher risk for a clot during the first year than during subsequent years," Dr. Hughes declared.

Some patients are initially afflicted with what doctors call atrial flutter. As in the case of fibrillation, atrial flutter takes over as the heart's pacemaker from the natural determinant, the sinoatrial (SA) node, situated in the right atrium. Stemming from a single abnormal beating source, the flutter eventually either degenerates into fibrillation, with multiple pacemaker sites, or allows a normal beat to return.

Strict criteria govern patient participation in the study. Among the conditions which will bar acceptance:

- Inability to understand or comply with the study or medication
- Bleeding tendencies or chronic use of anticlotting (antiplatelet) agents such as aspirin
- Additional reasons for anticoagulant therapy, such as to accompany the functioning of a prosthetic heart valve
- Presence of a clot or a ballooning on the wall of the heart (aneurysm)
- Rheumatic mitral valve disease
- Peptic ulcers, severe liver disease, uncontrolled hypertension, or a history of alcoholism

As part of the qualifying physical examination, all study participants must undergo an echocardiograph test which uses sound to provide a detailed outline of the heart's anatomy and to show how well the organ is working.

Later, as patients respond to treatment, physicians can review the individual echocardiograms to determine whether certain features in them are possible predictors of increased stroke risk.

All patients on warfarin will receive a blood test every three or four weeks, on average. The blood can be drawn at centers closest to a patient's home.

Special blood studies are also contem-

(Concluded on Page 4)

Mary Sheehan, RN, instructs Mr. Campanaro in the use of warfarin.

Halcyon Place Offers Families a Respite From Tensions

(Continued from Page 1)

Halcyon Place provides living accommodations for up to 27 hospital guests—adults and children—at nominal rates.

In addition to bedrooms, a large well-equipped kitchen enables visitors to prepare their own meals during their stay, which can last months.

The mansion, built in 1868 by a Massachusetts legislator, Samuel Hooper, also features a large formal living room, a library with a television set, a recreation room for teen-agers, and a playroom for tots.

A special room with direct wheelchair access to the street was constructed on the ground floor for handicapped guests. These quarters, unlike the others, offer a private bath.

The home away from home fulfilled a goal set five years ago by two mothers, Sheila Brown of Nashua, N.H., and Barbara Dillon, of East Falmouth, Mass., who each lost a teen-aged son to cancer.

Keenly aware from personal experience of frequent needs for a calm respite from the pediatric floors, Mrs. Brown and Mrs. Dillon recruited some two dozen other parents and, together with Dr. Truman and Dr. Allan Goldblatt, Chief of Pediatric Cardiology, worked to create the homelike setting.

Mrs. R. Morton Claflin of the MGH Board of Trustees served as principal liaison with the hospital administration during the formative years of the project, and Mr. Neil St. John Raymond, a Boston developer, directed the renovation of the property. Mr. Raymond presently is Chairman of the Advisory Board for Halcyon Place.

The mansion, bequeathed to the MGH in 1942 by a Boston attorney, Robert F. Herrick, was leased to the parents last year.

Halcyon Place is just what the name implies, a place of peace and tranquility. "The atmosphere is so beneficial when a person is very uptight and uncertain how things are going to turn out for a loved one," said Mrs. Dillon, who is a director of the organization. "A parent needs to be able to pull away but also to communicate with others who can offer reassuring words."

Although the original concept focused primarily on pediatric patients and their families, the door of Halcyon Place is open to adult patients as well. Many have taken advantage of available accommodations, paying only $20 per bed per night. The rate for children is five dollars less.

Mrs. Brown, who recently became a staff nurse in the Children's Service and is also a director of Halcyon Place, said guests at the mansion have come from a variety of places. "In addition to people from many areas of the United States," she said, "we have had visitors from Greece, Iran, Egypt, Argentina, and Brazil."

Most of the activity takes place in the kitchen. The aroma from the two stoves often carries an international flavor.

Mrs. Brown recalled one weekend when she stayed at Halcyon Place: "While a Puerto Rican lady was making a Spanish dish, an Irish lady was preparing a Mulligan stew. And I was busy making quiche."

At another time, one of the ladies baked a cake in honor of the 46th birthday of a liver transplant patient from upstate New York. People of several nationalities sat around the party table, some unable to converse except through sign language,

Families with loved ones under MGH care find Halcyon Place to be residence offers cooking facilities as well as bedrooms. At lower righ his teen-aged daughter, Jennifer, an MGH cancer patient.

Strokes

(Concluded from Page 3)

plated. Procedures other than prothrombin time may be used to test blood samples for clotting response. This work might produce a test capable of predicting potential bleeding complications from anticoagulants such as warfarin.

Every six months, patients will be contacted by telephone to update their health status, and every year a complete physical examination will be given. Any symptoms of a bleeding complication will be promptly evaluated by both a study physician and the patient's own doctor.

If any patient, either on warfarin or in the control group, develops a neurological deficit, Drs. Kistler and Call will evaluate all available data to determine whether a stroke had taken place and, if one had, whether it resulted from a clot originating in the heart.

Dr. Fisher will review the determinations of Drs. Kistler and Call without knowledge of whether the patient was on anticoagulant therapy.

Dr. Fisher said that 20 years ago many specialists believed that strokes were no more common among fibrillators in coronary heart disease than in nonfibrillators. Today, however, it is known that more than 75 percent of all cardiac clots causing strokes result from AF.

"Some physicians routinely give warfarin as therapy following AF and before a possible stroke," Dr. Fisher said, "but it's a big step to treat all such patients with warfarin for the rest of their lives. Our study is an attempt to see if it's indicated or practical." ■

ne away from home. Managed by Mrs. Dolores Billings, top right, the joying a midmorning snack, are Thomas Lohnes of China, Me, and

but all got into the spirit of the occasion.

Mrs. Dolores Billings, the house manager, said the woman who baked the cake also cooked pasta constantly and always invited everyone to join in.

She resided periodically at Halcyon Place because Dr. Truman was treating her 13-year-old daughter, Jennifer, for a form of bone cancer.

"Jenny needed chemotherapy only once a week, but she also had to have a very sophisticated type of radiation therapy five days a week," the doctor said.

"In the hospital she was fearful and depressed. After discharge and while she was staying at Halcyon Place with her mother, I remember seeing Jenny walking on the street one day with the biggest smile on her face, a smile that I never once saw while she was an inpatient."

After lengthy hospitalization, some of Dr. Truman's cancer patients have to make as many as 14 consecutive daily trips to the MGH for drug or radiation treatments.

The founding parents take turns staying at Halcyon Place every other weekend to give Mrs. Billings a respite. They also convene regularly at the mansion to plan fund-raising activities on behalf of their nonprofit enterprise.

"We're grateful to everyone who has helped," Mrs. Brown said. "We still need so many things. The bedrooms are pretty well furnished, but the teen room, for instance, could use a TV set and a stereo, and the tot room needs more toys."

"No one knows what the future holds," said Mrs. Dillon. "Right now, we're doing relatively small things to accumulate funds. It would be nice to see friends sponsor some kind of major once-a-year function that could give us something to fall back on. On the whole, though, Halcyon Place appears to be moving in a very forward direction. On the pediatric floors, Sheila frequently hears parents commenting about the benefits of the house."

Some of the families who have spent time there are described by British-born author Monica Dickens in her recently published book, "Miracles of Courage." Miss Dickens, who is the great granddaughter of Charles Dickens, wrote:

"The families understand and help each other . . . and here they find the kind of comfortable, reassuring friendship that is hard to find in the tense, preoccupied world of the hospital."

Miss Dickens donated many of the books in the Halcyon Place library.

Halcyon Place continually finds new friends. Its two kitchen freezers are kept stocked with free ice cream by a local company. From another firm have come a television set and videotape recorder. Another well-wisher delivered a word processor.

And every week or so, a neighbor cuts the mansion's lawn, then plugs in a trimmer and clips hedges. On occasion when finished, he drops into the kitchen, and the folks there have a chance to chat with that neighbor, Dr. J. Robert Buchanan, the General Director of the MGH. ■

Helping the Child With Spina Bifida

Every third Tuesday of the month a pediatric team gathers in the MGH's Wang Ambulatory Care Center to treat effects of one of the most crippling birth disorders known.

Some 30 years ago most children born with spina bifida—a defect of the spinal cord—died from infection or from pressure on the brain caused by an excessive buildup of spinal fluid (hydrocephalus).

The development of new infection-fighting drugs and techniques to halt the relentless progress of hydrocephalus have made it possible today for most victims of spina bifida to survive. But hope for a quality life still hinges upon the long-term assistance of a dedicated team of health care professionals.

At the MGH, Dr. M. Edward Keenan of the Children's Service heads a spina bifida program, coordinating his services with a 10-member team of specialists in ortnopedics, pediatric urology, neurosurgery, neurology, nursing, physical therapy, occupational therapy, and social service.

From the very first days of a patient's life, the team manages the child's growth and development, coping with many difficulties along the way, and strives to assure the individual's compatibility with changing social environments.

(Continued on Page 6)

Care of Spina Bifida Patients Improves

(Continued from Page 5)

Spina bifida (from the Latin, a divided spine) affects approximately 2 of every 1,000 newborns in the United States each year, or about 6,000 children.

Of those who survive the first 24 hours of life, 75 percent will have severe physical handicaps, such as paralysis of the lower extremities, loss of bladder and bowel control, and inability to sense pain, temperature, and touch. Although 20 percent of spina bifida patients suffer varying degrees of mental retardation, the others possess normal, sometimes above normal, intelligence.

Spina bifida dates from a mother's first month of pregnancy, often before she even knows that she is going to have a child. The process of forming the brain and spinal cord (the central nervous system) starts around the 24th day after conception although the embryo is then no larger than a grain of rice.

A flat strip of cells at the neck of the embryo begins to fold inward to create a tube. Known as the neural tube, it is the precursor of the nervous system. The tube closes first at its midpoint, then toward either end and sinks beneath the embryonic skin. The upper part of the tube will develop into the brain, the lower segment into the spinal cord.

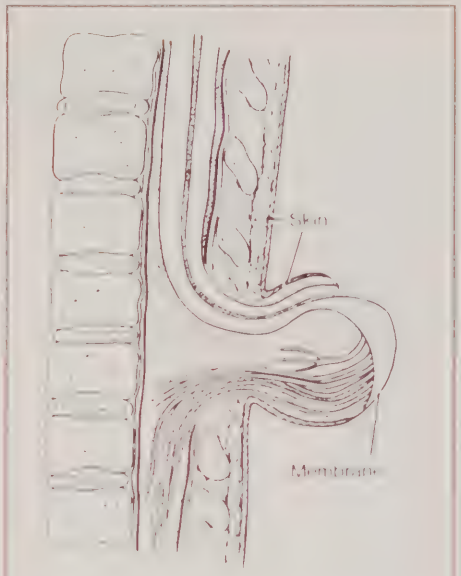
Failure of the upper portion to completely close leads to abnormal brain and skull formation (anencephaly) and death. Spina bifida occurs when an opening remains in the lower portion of the tube.

The degree of spinal deformity and nerve loss caused by spina bifida varies. Some patients have slight physical handicaps. The membranes, or meninges, which cover the spinal cord (as well as the brain), may protrude through the defect in the back while the cord itself remains intact inside.

In the more common—and more serious—situations, both the cord and the meninges protrude, a condition called meningomyelocele. Dr. Keenan said that a very thin skin covers the exposed matter, and frequently this sac ruptures during birth or soon afterward. Infections may follow. In the past, they have often proved fatal, but today physicians can quickly cope with such complications.

The sac also creates an unwanted reservoir of spinal fluid, which normally circulates through compartments (ventricles) in the brain, then over the brain's surface and through the spinal cord. Interruption of this circulation causes the ventricles to overfill (hydrocephalus) and the head to expand in size.

Today, surgeons install a shunt in one of the ventricles to drain the spinal fluid into the abdominal cavity. The fluid reduction not only cures the hydrocephalus but also enables the spinal sac to shrink. The surgeons can then close the opening in the patient's back and cover the spinal defect with thick skin taken from an intact surrounding area.



A form of spina bifida (meningomyelocele) in which part of the spinal cord and the membranes covering it protrude through a defect in the spinal column

"As these patients go through life, they display a tremendous inner strength, a brightness and enthusiasm that one seldom sees in patients with other afflictions," Dr. Keenan said. "The smallest increment of gain is fully appreciated."

The team works early on through the use of braces to help the patient become upright so that, as Dr. Keenan put it, "the child can see the world in the same way that you and I do."

A physical therapy program becomes extremely important in helping the child to achieve mobility. The therapist tries to maximize the function of every workable nerve fiber in the patient's body.

Owing to inability of the bladder to contract normally, urinary tract infections damaging to the kidneys may result, but in recent years prosthetic urinary valves (sphincters) have been developed which permit the child to remain continent and help minimize infection.

Dr. Keenan said that the loss of bowel control due to spina bifida can be overcome through training and regulation of bowel movements.

With bowel and bladder difficulties dealt with, the child can enter the mainstream of society. "In Massachusetts, we start our spina bifida children in special education programs as early as three years of age," Dr. Keenan said. "They soon learn to interact with other children who do not have significant problems.

"We also have early stimulation programs for infant groups."

The Massachusetts Spina Bifida Association labors to make it possible for patients to reach their classrooms.

"In England, these children are placed in schools by themselves because some people feel that it's too depressing to the youngsters to have to compete with others who don't have the same difficulties," Dr. Keenan declared. "We don't accept that view. We find that attendance in a regular classroom is a powerful inducement to our children to live up to their maximal potential."

What factors lead to spina bifida? "Genes are clearly part of the story," said Dr. Richard W. Erbe, Chief of the Genetics Unit at the MGH, "but environmental factors must also be considered.

"If a woman who gave birth to a baby with spina bifida had another child, the chance of the second infant having the disorder would be 2 or 3 percent. In contrast, if the disease in question were, say, cystic fibrosis or sickle cell anemia, the chance of a repeat episode would be on the order of 25 percent.

"As for environment, spina bifida, for some reason, is two to three times more prevalent in the United Kingdom than in the United States. No one knows why. It has also been suggested that hyperthermia [abnormally high body temperature], certain drugs, and a high level of background [natural] radiation contribute to occurrence of the affliction."

Tests are now available which can detect neural tube abnormalities early enough in a pregnancy to permit genetic counseling. The prospective parents can learn what options are available, and if they decide to continue the pregnancy, their doctor can arrange for special care at the time of delivery and afterward.

One procedure, a maternal serum alpha-fetoprotein (AFP) test, measures the level in a woman's body of a protein made by the fetus and discernible only 29 days after conception.

Of every 1,000 women tested, about 950 will have a normal level. Of those discovered to have an elevated AFP, the finding, rather than being a complication,

A New Device to Protect a Failing Heart

When Robert Kellie, a New England Telephone Company Network Consultant, reported for work last July 15th, he could hardly have imagined that the very system he was striving to improve would help to save his life.

"I had gone into a conference with Thomas Whelan, who coordinates the company's five-state 9-1-1 system for police, fire, and medical emergencies," Mr. Kellie said. "We were drafting a proposal to the City of Boston for a new E 9-1-1 system which automatically traces the location of a caller who might be unable to give it.

"Suddenly I collapsed in Mr. Whelan's State Street office. Tom immediately called 9-1-1 and reported that a person was having a seizure. As my condition appeared to worsen, Tom started to perform CPR [cardiopulmonary resuscitation]."

Since the first indication the 9-1-1 Emergency Center had was that Mr. Kellie had suffered a seizure, Emergency Medical Technicians Charles McNamara and Craig Morrill of the Boston Department of Health and Hospitals were sent to the scene. Realizing that the disorder involved Mr. Kellie's heart, they rushed through a call for paramedics, who are more highly trained for such situations. Paramedics David Ladd and Richard Sorino soon joined the two EMTs.

Because of the efforts of the rescue teams, the 52-year-old patient was awake and fully alert by the time he reached the Emergency Ward of the MGH.

Dr. Charles J. McCabe, the hospital's Assistant Chief of Emergency Services, said Mr. Kellie's heart had developed irregular impulses in its pumping chambers (ventricular fibrillation). Such impulses, or arrhythmias, lead to circulatory failure and claim the lives of hundreds of thousands of people each year in the United States.

Two weeks of tests showed that drugs could not suppress Mr. Kellie's irregular heartbeats but indicated that he might benefit from implantation within his body of an automatic defibrillator.

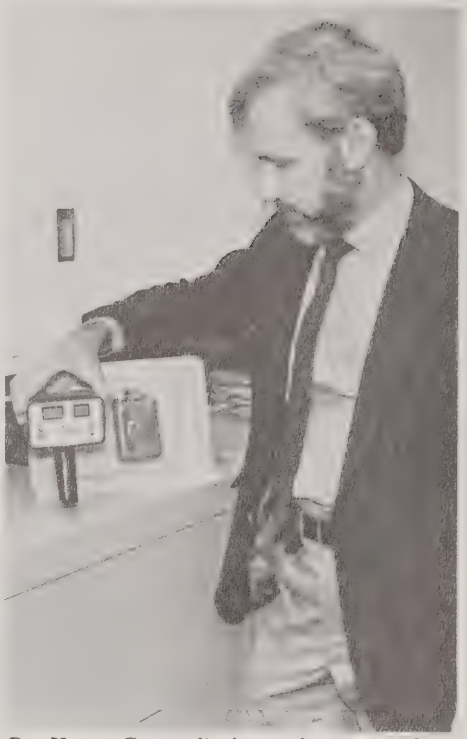
Mr. Kellie, who resides in West Bridgewater, Mass., became only the 15th MGH patient in two years to receive such a defibrillator. It was developed at The Johns Hopkins Hospital in Baltimore by a team headed by Dr. Michel Mirowski. He now directs the Coronary Care Unit of Sinai Hospital of Baltimore.

The device, implanted in Mr. Kellie's abdominal wall, continuously monitors his heart rhythm. In the event of a potentially deadly ventricular arrhythmia, the beeper-sized instrument is ready to deliver a strong electrical countershock to restore normal rhythm.

"The average patient in whom the electronic package is installed not only has extensive heart disease but has had at least one cardiac arrest outside the hospital," said Dr. Hasan Garan, Codirector of the MGH's Cardiac Electrophysiology Laboratory. "The combination of extensive disease and a previous cardiac arrest makes the patient an exceedingly high risk for a repeat arrest."

He said 13 MGH defibrillator patients have experienced at least one "firing" of their device which probably saved their lives. In one patient—a 20-year-old man—the apparatus, called AICD (Automatic Implantable Cardioverter/Defibrillator) has discharged about 50 times.

Used in patient care for the first time five years ago, the instrument is presently offered by only a handful of centers, such as Johns Hopkins, Stanford, Sinai of Baltimore, and the MGH.



Dr. Hasan Garan displays a beeper-sized, implantable defibrillator and a device used to check the operating status of the small instrument.

Of more than 250 implantations, the arrhythmia mortality has been 2 percent per year as compared with an expected arrhythmia mortality of more than 35 percent in this patient population if they did not have the benefit of AICD.

Dr. Garan said that without such protection a person who suffers a ventricular arrhythmia must receive CPR immediately at the scene and reach a hospital within minutes for life-saving treatment by specially trained personnel.

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could indicate the presence of twins or that the pregnancy is further along than originally thought. This simply means further studies are called for, such as a view of the fetus through ultrasound.

If ultrasound fails to resolve the issue, amniocentesis follows. With ultrasound to guide the way, a doctor inserts a needle into the mother's abdomen and extracts a quantity of amniotic fluid from her uterus. The amount of AFP in that fluid is then determined.

The combination of the maternal serum AFP test, ultrasound, and amniocentesis can reveal more than 95 percent of all open neural tube defects.

AFP tests for MGH patients are processed in the Genetics Division of the Eunice Kennedy Shriver Center in Waltham, Mass. The division, also directed by Dr. Erbe, evaluates some 3,000 AFP exams annually for physicians in Greater Boston.

"Many practitioners today are routinely ordering measurements of alpha-fetoprotein in pregnant women," Dr. Erbe said. "In New England, the percentage of such tests is particularly high in Maine. Besides spina bifida, the examination assists in screening for Down's syndrome and a number of other chromosomal abnormalities." ■

The Spina Bifida Team

Specialists involved in the MGH Spina Bifida Program, coordinated by Dr. M. Edward Keenan, include Drs. Michael G. Ehrlich and David Zaleske, orthopedists; Samuel H. Kim, pediatric surgeon and urologist; Paul H. Chapman, neurosurgeon; and Kalpathy S. Krishnamoorthy, neurologist.

Other team members: Debra A. Mulley, nurse practitioner; Jane Merrill, physical therapist; Jacqueline Goodwin, occupational therapist, and Ruth Paris, social worker.■

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Heart Aid Contains Great "Firing" Power

(Concluded from Page 7)

The defibrillator eliminates the constraints of time and need for special personnel by automatically sensing the arrhythmia and taking instant action to rectify the episode.

Most survivors of out-of-hospital cardiac arrests had heart attacks previously. Sometimes they were followed within minutes by life-threatening arrhythmias even as pain from the attacks persisted.

"In the vast majority of arrhythmias, however, the patient had a heart attack in the remote past," Dr. Garan said. "The individual recovered from the myocardial infarction, returned to family and job, and then suddenly collapsed and died without any pain. The earlier attack had scarred the heart, making the patient a candidate for an arrhythmia."

Mr. Kellie is one of a minority of arrhythmic patients who never had a heart attack. A general deterioration of that organ made him susceptible to irregular heartbeats.

Sealed in titanium, the defibrillator, manufactured by CPI, a division of Eli Lilly and Company, contains special lithium batteries that can supply monitoring power for three years or deliver more than 100 discharges. Each pulse is some one million times stronger than that of a cardiac pacemaker, designed to prevent excessive slowing of the heart.

Future generations of the defibrillator are expected to be smaller and more versatile than the present ones.

Using an instrument called AICDCHECK furnished by CPI, together with a magnet, Dr. Garan and his staff can easily assess the status of an implanted unit.

"Placing the magnet on the skin close to the implanted box activates a beeping system in the device," Dr. Garan explained. "An audible beep is emitted every time the unit senses a beat, so you know the instrument is working.

"When the magnet is removed, AICD automatically begins charging its capacitors. An AICDCHECK probe placed on the skin relays to that machine the number of seconds that the charging process takes. Thus, by an AICDCHECK reading, the doctor knows that the implanted box has the battery power to do its job."

AICDCHECK provides a further service. Instead of the patient having to keep track of the number of times his monitor has discharged to correct an arrhythmia, the external meter can detect and reveal the number for the patient's physician.

Dr. Garan said AICD apparently fired inappropriately in two MGH patients, but neither was placed in danger.

"We believe the box was responding to rhythms other than those it was meant to sense," he said. "We simply altered each patient's medication for heart disease so that the rate of those other rhythms no longer met the criteria which would cause the box to fire."

Any patient with a foreign device in his body, regardless of what the unit may be, must be particularly aware of the importance of good personal hygiene.

"A skin or urinary tract infection or a dental abscess, for example, must not be neglected," said Dr. Garan, who is also an Assistant Professor of Medicine at Harvard Medical School. "An infectious agent in the blood can lodge in the implanted object, and it then becomes impossible to sterilize the device with simple antibiotic drugs. Sometimes only a complete extraction of the object and its connectors will eliminate the infection."

Robert Kellie, who spent three weeks in the hospital because of his arrhythmia, said his new defibrillator has not meant any special restrictions on his life-style. He said:

"I was advised to avoid any activity that might entail rough contact with the defibrillator or its lead wires and to stay away from any strong magnetic field which could cause the instrument to act as if it's being tested."

Asked how he feels, he responded, "Terrific." ■

Technician Concetta DeRosa administers an electrocardiograph test to Robert Kellie whose heart is protected against irregular impulses by an instrument implanted in his abdominal wall.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 44 No. 9 December, 1985

Health Center Scores Gains Against Heart Disease

Drinking Becomes Rampant Among Young

They seek medical help for uncontrolled tremors, hallucinations, blackouts, sporadic losses of memory, or injuries from a fall, fight, car crash, even attempts at suicide.

The complaints span a broad range of physical and mental ills, but, in this case, each sprouts from the same seed—alcohol abuse.

Rather than confront their basic problem head on, the vast majority of alcohol abusers focus on relief only from the consequences of their drinking.

The denial of alcohol abuse coupled with the portrayal of drinking in advertisements, movies, and television as romantic or macho, and the ease of obtaining alcoholic beverages have created a monumental, and terrifying, problem among teen-agers.

The nation's youth are experimenting with alcohol at an earlier age than ever before. The National Council on Alcoholism reports that among children between 14 and 17, some 3.3 million—or close to 1 in 5—have developed a serious drinking problem.

A congressional report on alcohol and health also discloses that in a survey 15 percent of students in grades 10 through 12 admitted drinking at least once a week and consuming five drinks or more during each episode.

More than 9,200 teen-agers die each year in this country from alcohol-related accidents.

Because of the increasing seriousness of the drinking problem, the MGH Alcohol Clinic more than a year ago added an adolescent component to the clinic's treatment program.

When they first visit the clinic—usually at the prodding of their parents or referred by the Emergency Ward (E.W.) after treatment for some disorder—young people rarely admit to having an alcohol problem. But Dr. Marie E. Armentano, the child and adolescent psychiatrist on the clinic staff, said that the resistance is predominantly superficial.

"At the outset, most insist that they act no differently than their friends," she said, "but as they continue to talk, the existence of a problem does become apparent."

A 14-year-old girl who stayed out all night on three occasions and was brought to Dr. Armentano's attention after being

(Continued on Page 2)

Working visits to China by two staffers from the MGH Children's Service have helped to improve neonatal and pediatric health care in that country. Story on Page 7

Six years ago, the MGH, in collaboration with Harvard Medical School, launched a campaign against coronary heart disease (CHD) by attacking factors which are believed to cause it.

With goals of rehabilitating the heart attack patient and reducing chances for a subsequent coronary event, as well as preventing CHD in people thus far only at risk, the MGH–Harvard Cardiovascular Health Center has cared for approximately 1,000 men and women since 1979.

"Although we know how much the programs make people feel better, we still have to collect and analyze more data to know how well the heart itself may improve," said Dr. Alexander Leaf, Director and organizer of the center. "But the results thus far are encouraging."

Dr. Gregory D. Curfman, the center's Medical Director, said that, among participants in the overall program, levels of blood cholesterol—a principal risk factor for atherosclerosis—have fallen by 15 to 20 percent. At the same time, protective HDL (high density lipoprotein) levels in the blood have risen slightly.

The exercise capacity of the patients has increased by 25 to 30 percent. "Initially, some of the patients would have developed angina [chest pain due to inadequate blood flow to the heart] during exertion," Dr. Curfman said, "but they now find they can exercise to higher intensities than before without discomfort."

The Cardiovascular Health Center conducts two types of structured exercise programs, one involving the use of Harvard's famed indoor track and the other concentrated in a facility constructed in the basement of Ruth Sleeper Hall on the MGH campus.

The MGH's Exercise Laboratory features stationary bicycles, treadmills, row-

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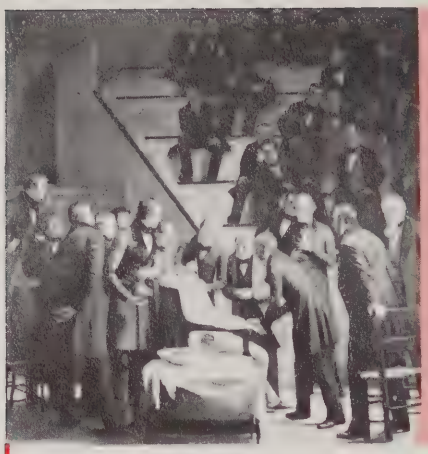

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EDITORIAL:

Bus Drivers and Conductors

Some 20 years ago cardiovascular researchers compared London bus drivers to colleagues who collected the fares. The drivers sat in their seats all the working day. The conductors spent their day climbing and descending the stairs of the double-decker buses. Sedentary versus exercise pursuits during the same length of time on the same conveyance. A study waiting to happen.

Would those who climbed the stairs fare better in avoiding heart disease than those who sat? In a word, yes. In the five-year study, drivers had a significantly higher rate of reduced blood flow to the heart (ischemic heart disease) than conductors. Exercise seemed to have a beneficial effect.

Since the study, investigators have looked at the effects of exercise in a variety of ways. And the evidence seems to be accumulating that exercise has a salubrious effect on cardiac fitness. Studies of good nutrition (limiting red meat, *whole* milk, etc.) are beginning to show that what you eat and don't eat can lower the kind of blood cholesterol which is associated with coronary artery disease. Evidence linking smoking with heart disease has also been accreting at a convincing rate.

What happens to a patient at risk for heart disease who stops smoking, who diets and who limits certain fatty foods, and who starts exercising? The answer seems obvious enough. But scientific results do not always follow apparent logic. To obtain scientific confirmation, MGH–Harvard investigators have been studying the combined effects of a program that aims at changing the life-style of patients in all four major ways.

Early returns show significant objective improvements that confirm similar research elsewhere. There is more work needed before the evidence becomes conclusive and especially before more detailed guidelines take on scientific meaning. But the evidence already is promising enough to make many physicians number themselves among the converts to a new life-style. Perhaps the most convincing result is the least scientific. Converts feel better.

Teen-Age Drinking

(Continued from Page 1)

found drunk outside her home maintained that there was no cause for concern. But later she admitted that during one drinking spree she engaged in reckless activities, including jumping off some high rocks, which could have resulted in injuries.

A 17-year-old boy was referred to the Alcohol Clinic after E.W. treatment for bruises suffered when he fell into a hole at a construction project. Insisting that he was not a problem drinker, he said, "Sometimes when I go out with my friends, I bring along a container of spring water, and I drink the water instead of alcohol."

"No one would take a precaution like that unless he was worried about how much alcohol he had been drinking or was likely to drink," Dr. Armentano declared.

Why do youngsters experiment with alcohol? "Teen-agers think it's sophisticated," said the MGH psychiatrist. "It's identified in the movies and on TV with being grown-up. It's what adults do to have fun. It's a social lubricant at a party.

"And alcohol acts like an anesthetic. Young people whose lives are filled with pain, due perhaps to family conflicts or poor grades in school, sometimes turn to drinking as an escape from reality."

Among teen-agers who are treated for serious alcohol abuse, more than half present a family background of one or both parents being alcoholic. A home marked by such parental behavior is fertile ground for the spread of the drinking habit.

Sometimes a parent expects more from a child than the child can give and drives the offspring to alcohol, other drugs, or a combination of both.

Writing on alcohol abuse in the publication *The New Physician*, Dr. Armentano also expressed belief that a large number of adolescents with drinking problems do not feel supported or cared for either at home or in school and have a sense of despair about their eventual ability to fit into adult life.

"In the years from puberty to young

Photographs: Pages 1, 8, courtesy of Dr. I. David Todres; p. 3, from the dramatization "The Late Great Me: Story of a Teen-Age Alcoholic," courtesy of the ABC Television Network; p. 4, Scott Davis; p. 5 (upper), courtesy of Kristine Nelson; pp. 5 (lower), 6, Myron Daniels; p. 7, courtesy of Althea Cervantes

Most teen-agers with a drinking problem deny it and insist that they are only emulating their friends.

adulthood adolescents must go through many difficult and yet vital changes if they are to be functioning members of adult society," she wrote. "They must adjust to their changing bodies, make an emotional separation from their parents, and achieve a sense of identity. . . . The adolescent often finds the new challenges to be anxiety producing."

While alcohol, like most drugs, leads to a sense of euphoria, it is actually a depressant, such as barbiturates, opiates, and tranquilizers, and slows bodily functions. Concentration, coordination, and speech become distorted. At the same time, inhibitions decrease. The combination sets the stage for many of the accidents we read about.

A single episode of drunkenness is usually not a cause for concern, but only the patient really knows whether it is the first such instance or the most recent of many.

A thorough psychiatric evaluation of the patient is in order if the episode is thought to be more than an isolated occurrence. To determine possible dependence on alcohol, the psychiatrist looks for certain behavior patterns, e.g., reaching for the bottle in the morning, drinking often by oneself, turning to alcohol to overcome fear or shyness, and becoming forgetful after drinking.

Also, cutting classes at school with a resultant fall in grades, unexplained withdrawal from family affairs, associating with friends also suspected of alcohol abuse, and frequent lying about drinking and various other activities are suggestive of a serious alcohol or drug problem.

One of the most potentially dangerous of all drugs, alcohol can affect the liver, kidneys, heart, and brain, causing permanent damage and even death. But such physical effects develop over a period of years, which makes it so important to detect and straighten out the teen-aged alcohol abuser while he is still in his formative years.

Frequently, Dr. Armentano finds that depression is at the root of an alcohol problem. Depression in adolescence, she said, has often been underdiagnosed. Such patients commonly respond to antidepressant medication.

"If a patient turns out not to have a treatable depression, I arrange to meet with him on a weekly basis to discuss what is happening in his life and to help him evaluate the impact of alcohol," Dr. Armentano said.

"Older patients, those already in college, are more apt to keep scheduled appointments. Younger ones sometimes look for excuses not to come and therefore may need a third party, ideally a parent, to motivate them."

Once the basis of a young patient's difficulty has been uncovered, further intervention may be offered in a group setting. Such help may be available through Alateen (affiliated with Alcoholics Anonymous), school alcohol education classes, or a clinic-based group.

How parents act and the part that alcohol plays in their own lives is their child's strongest teacher. Children emulate their parents. If alcoholic parents can address their own drinking, their offspring may follow suit.

Some parents impose limits on their children, hoping to curb a drinking habit. But limits are not always enforceable. The quality of communication between parent and teen-ager may be more important. For example, offering transportation home from a party if the youngster succumbs to the temptation to drink often induces the child to undertake greater responsibility for his own behavior.

"Many adults think that adolescents do not need or want adult help, but nothing can be further from the truth," said Dr. Armentano, who is also an Instructor in Psychiatry at Harvard Medical School. "Adolescents who are bogged down in alcohol abuse can benefit greatly from a tie with another person or persons who can provide both confrontation and support.

"What is needed is a firm expectation that if the adolescent deals with what he must, everything will turn out all right." ■

Anxieties that beset young people as they approach adulthood and its responsibilities can lead to alcohol abuse.

Two patients in the MGH Exercise Laboratory receive a physical check before pedaling stationary bicycles.

Exercise and Diet Speed Return to Health

(Continued from Page 1)

ing machines, and other body conditioning equipment. Assignment of an exercise regimen is determined by both the patient's overall condition and personal preference.

At the center's inception, the activity spotlight focused on the Harvard track (*MGH News,* December 1979). Wearing telemetric radio transmitters for cardiac surveillance, patients intermittently jogged and walked along stretches of the springy oval.

The transmitters continuously relayed electrocardiogram and heart rate signals to a nearby receiver where the information was monitored.

A physician or cardiac nurse specialist often joined in the workouts, matching strides with the patients.

Today, groups meet at the track three times a week for 90-minute exercise and jogging sessions. The core program for each patient runs for three months.

Dr. Curfman told of a 41-year-old businessman who commuted from New Hampshire to take part in the program.

After having suffered two heart attacks in less than two years and learning that he had disease in three coronary arteries, Bill M. reflected on his family's long history of heart trouble and at first held little hope for his own future.

During his illness, he found that his despondency was made even more severe by financial reverses in the small manufacturing operation he had built.

Bypass surgery improved his coronary blood flow, and Bill then entered the rehabilitative phase of his recovery. As a result of his track exercise, coupled with proper diet, Bill lost 15 to 20 pounds, lowered his cholesterol from 260 to 150, and raised his HDL to a very favorable balance with LDL (low density lipoproteins) in the blood.

Dr. Curfman said that even without the physical training, Bill probably would have returned eventually to full-time work, but the cardiovascular center speeded the process and got him into a much better physical condition than he could have achieved on his own. The supervised workouts also enabled him to see that he could be physically active once again without endangering himself.

Center participants, who are medically stable, have sometimes participated in special road races. One Boston event, called the Governor's Cup Race, offers a choice of a five-mile jog, a three-mile walk, or a one-mile walk. Prizes are awarded in various age categories.

Since track activity appeals only to a segment of the patient population, the exercise lab at the MGH provides diversified options to the 100 to 150 people enrolled in the center at any one time. Three quarters of them men, the members range in age from 35 to 81.

About 85 percent have been treated for CHD. The remainder are considered at risk for a heart problem because of diabetes, high blood pressure, excessive cholesterol, or obesity.

The center's staff includes three cardiologists, Drs. Curfman, G. William Dec, Jr., and Gregory S. Thomas; two internists, Drs. Wayne L. Peters and Harvey B. Simon; four cardiac nurse specialists, Kristine M. Nelson, M.S., RN; Kathleen McKool, M.S., RN; Christie Kuo, RN; and Joanne Casale, M.S., RN, and two nutritionists, Carolyn J. Crimmins, M.P.H., RD, and Nadine S. Braunstein, M.S., RD.

A staff nutritionist counsels all center members privately as well as in evening classes. Dr. Peters, who directs this program, may prescribe a drug to deal with genetic abnormalities of cholesterol metabolism when dietary treatment is not completely successful.

The series of six evening nutrition classes focuses on weight reduction, lowering cholesterol, and other needed dietary changes. Lectures by physicians and demonstrations of healthful cooking are also scheduled. Miss Kuo, for instance, presents a course on soy foods. "The Soy of Cooking," she calls it. The audience enjoys sample meals, from appetizer to dessert.

Nutrition classes run for six weeks with a break halfway through to allow new members to join in. The staff does not restrict enrollment to the center's exercise participants.

The staff places heavy emphasis on the need to stop smoking. "Smokers are at least twice as likely to suffer a heart attack during their lifetime as nonsmokers," said Dr. Curfman, who is also Assistant Professor of Medicine at Harvard Medical School. "People who give up smoking can reduce their risk of an attack by about 50 percent within two years after stopping."

Dr. Curfman warned that those who exercise and continue to smoke are only kidding themselves. "Exercise will not counteract the deleterious effects of continued smoking," he emphasized.

The cardiac nurse specialists regularly outline to members the options available to help them quit smoking, resources such as hypnosis, self-help groups, or some community-sponsored program.

"We're tough on this," Miss Nelson said. "If an individual hasn't stopped smoking by completion of our program, he will not be allowed to graduate with his class."

Many examples can be cited of patients who benefited from the staff's advice. Ann B., who smoked heavily and developed excessively high cholesterol, joined the

program after suffering a heart attack at the age of 56.

Ann stopped smoking, revised her diet, and for exercise chose to take a brisk three-to-five-mile daily walk. Her cholesterol fell into a normal range, her HDL rose, and, to quote Dr. Curfman, "She is now in very good shape, with no further symptoms of illness."

Each nurse follows about 150 patients, including graduates of the MGH–Harvard programs who return periodically for checkups. Some resume regular visits to the exercise lab or the track if they have begun to fall out of shape again.

In presenting the virtues of the MGH–Harvard Cardiovascular Health Center, Dr. Curfman conceded another side to the story:

"Fully 35 percent of the people who enter our programs drop out. This is about the national average in projects of this kind.

"Demographically, it is the blue collar smoker who is most likely to leave. The excuses are many. 'I don't have the time,' or 'I don't believe that it's doing me any good.'"

Sometimes, lack of home support can be blamed. When someone in a patient's household continues to smoke, for instance, the action encourages the patient to do so as well.

"Changing life-styles built up over many years is one of the most difficult tasks in preventive medicine," said Dr. Leaf, who is Ridley Watts Professor and Chairman of the Department of Preventive Medicine and Clinical Epidemiology at Harvard Medical School.

Members of the cardiovascular health program limber up before jogging at Harvard's indoor track.

Writing in a recently published book entitled *Cardiology Clinics,* which deals with preventive cardiology and cardiac rehabilitation, Drs. Leaf and Curfman pointed out that in 1981 coronary heart disease took 700,000 lives in the United States.

"With disease of such epidemic proportions in our society," they wrote, "it is evident that the treatment approach to established disease can have only limited success in combatting [sickness and death].

"Even if drug therapy and surgery were completely successful, the high costs of the treatment modalities would make the expense prohibitive. More important, this approach does nothing to prevent the next generation of 30-, 40-, and 50-year-old persons from suffering the same disease. Thus, preventive measures must be part of a national strategy to reduce this major health problem."

Dr. Leaf has received numerous inquiries about the work of the MGH–Harvard center. Only a few weeks ago, an eminent cardiologist from Osaka, Japan, sought advice on initiating a similar venture in his country.

The center would be the first of its kind in Japan where heart attacks once were infrequent but now apparently are becoming a significant problem due to lack of exercise and an increased prevalence of western diets. ■

Buying the Right Kind of Medicine

Generic or brand name?

From drug store counters to the halls of Congress the longstanding debate rolls on . . . and on.

Should a person bypass brand name drugs and choose instead a competitive chemical equivalent, usually selling at a much cheaper price?

The question was put to two knowledgeable MGHers, Harold J. DeMonaco, R.Ph., the hospital's Director of Pharmacy who also holds a Master of Science degree in Therapeutics, and Dr. Carl E. Rosow, an anesthesiologist with an additional doctorate in pharmacology. They responded with a resounding "It all depends. . . ."

It depends to a great degree, they said, on the patient's specific needs for a particular drug and the individual's variability of response and tolerance to such medication.

"Consider aspirin," Mr. DeMonaco said. "If you occasionally took two aspirins for a headache, it probably would make no difference whether you bought a brand name product, such as Bayer, or some generic item because you may easily tolerate that quantity of the drug, regardless of any variation of anticipated effect.

"But if you had rheumatoid arthritis and were taking up to 30 aspirins a day to quell the inflammation and pain of the

(Continued on Page 6)

MGH Pharmacist Richard Connolly fills an order for medication.

Generic or Brand Name Drugs?

(Continued from Page 5)

disease, then the selection becomes very important."

Mr. DeMonaco explained that poorly formulated aspirin may begin after time to smell vinegary when its bottle is uncapped. "That means you've got salicylic acid now, not aspirin," he said. "The arthritic who needs a large quantity of aspirin can wind up with salicylate poisoning because he chose to buy the cheaper product."

Dr. Rosow said that brand name manu-

Generic drugs

facturers usually formulate their aspirin tablets much better than the small generic producers. The patient also has greater assurance that as he begins a new bottle he will be getting the same medication as before.

"There is a price to be paid, however, for such quality control," Dr. Rosow declared. "Unfortunately, it's the poor individual who cannot do without the drug who must pay that extra cost."

Many medications sold as generic counterparts to so-called proprietary, or brand name, products are not exact duplicates. The law permits many generic items to qualify as interchangeable despite a variation of plus or minus 30 percent from the proprietary drug.

"There can be very wide variations in the tolerance one has for a drug being off, and thus it can make perfectly good sense to buy generic," Dr. Rosow said. "If you wanted sedative properties in a drug—a barbiturate, like phenobarbital, for example—to produce a little bit of relaxation, you would have great tolerance for fluctuating blood levels."

But the doctor also pointed out where exact formulation would be a vital consideration:

"If the drug were given in high or repeated doses to help control seizures, then the tolerance for variations from some specific norm would be quite low."

In Massachusetts, the state's Department of Public Health maintains a list of generic drugs which can be substituted for brand name medicines. The list, updated yearly, would fill a small book. If in writing a prescription, a doctor does not specify a brand name product, a pharmacist must dispense a generic one, provided that it appears on the interchangeable drug roster.

Dr. Rosow expressed mixed feelings about that list. "It includes many drugs," he argued, "on which not enough data have been collected to verify interchangeability.

"In most cases, one may never notice a difference clinically, but the Commonwealth is saying, in effect, that the patient is getting the same as the proprietary product unless somebody can prove otherwise."

The law mandating generic drugs when possible relates primarily to community pharmacies. Also, if a store finds it has run out of a particular generic item while serving a Medicaid or Medicare patient and substitutes a brand name drug, federal reimbursement is still based on the generic price.

Fewer restrictions apply to the dispensing of drugs in hospitals, but Mr. DeMonaco said that for as long as anyone can remember, the MGH has referred to medicines by their generic identity. "In our case," he added, "some of the names are generic ones for patented products."

Contrary to general belief, although the federal Food and Drug Administration (FDA) approves drugs for use in this country, the agency does not set the standards for pharmaceuticals. The United States Pharmacopeia (U.S.P.) Convention has that responsibility.

Published since 1820 (and first printed in both Latin and English), the U.S.P. lists medical products with descriptions, chemical tests for determining identity and purity, and formulas for certain mixtures of these substances. It also generally contains a statement of average dosage.

Some drugs, such as digitalis-derived medicines taken for a heart condition, have a very narrow margin of safety between therapeutic value and toxicity. Because of this characteristic, such medications do not have generic equivalents on the Massachusetts interchangeability list.

Mr. DeMonaco said that when a patient does well on a type of drug produced by one pharmaceutical company he should generally stay with that medicine. Although it would be exorbitant to use only brand name drugs, he said, this would be unnecessary for the majority of patients.

Even if laboratory tests show two drug products to be equally safe and effective, their impact on patients could vary. The medical explanation is bioavailability—the rate and extent to which the key ingre-

Brand name drugs

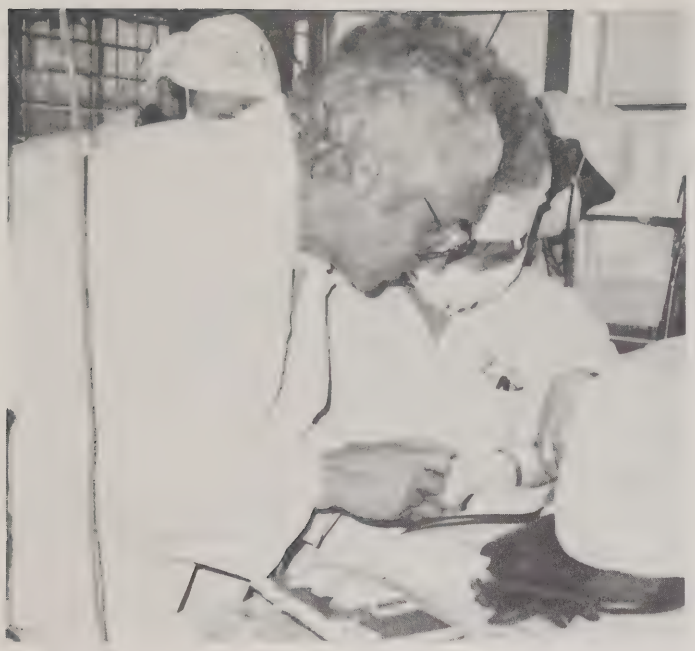
dient in a drug is absorbed and goes to work where needed.

Dozens of factors influence bioavailability, e.g., the kind of binders and coating used to hold a tablet or capsule together, how quickly the drug dissolves and enters the blood stream, and how long the medicine remains in the body.

The effectiveness of a drug can also vary considerably because of the time of day the agent is given. Since the body's biological clock (circadian rhythm) is attuned to a daily, 24-hour cycle of light and darkness (*MGH News,* October 1979), the rate of metabolism and excretion of the drug can change, sometimes justifying a decrease in dosage.

FDA approval of a medicine embraces the recipe for making it. The company earning the patent is held accountable for manufacturing techniques as well as the final product. Such is not the case with a generic version. It may be produced by quite a different means but still conform to the standards of chemical purity stated in the U.S.P.

With the production of generics in re-



Dr. David Todres of the MGH treats a patient at a children's hospital in Hangzhou, China, while staff members observe.

American Aid Advances Medicine in China

The Chinese have a saying, "In the sky there is heaven . . . on earth, there is Hangzhou."

In 1273 when Marco Polo visited what was then the seat of the Sung Dynasty, he described the city as one of the most beautiful in the world.

Even today artists and poets flock to Hangzhou to paint or write about its famed West Lake, dotted with islands on which stand temples, monasteries, and attractive homes.

Like most of China, however, Hangzhou, some 100 miles southwest of Shanghai, has a lot of catching up to do. While its grandeur serves as a magnet for tourists, the quality of its health care lags behind.

Last spring, under the auspices of Project Hope, Dr. I. David Todres, Chief of the MGH Newborn and Pediatric Intensive Care Units, and Althea Cervantes, RN, a staff nurse in the Pediatric ICU, traveled to Hangzhou to offer their counsel. The doctor's visit to the area was his second in two and a half years.

The MGH team worked daily in Hangzhou's 320-bed Children's Hospital, the only such institution in Zhejiang province which has a population exceeding 38 million.

"We were confronted with a kind of medical practice that one saw in the United States at least 25 years ago," Dr. Todres said.

"The X-ray machines were kept in a remote building," Miss Cervantes added. "Patients had to be taken out of one building and into another one down the street. There was no way to take emergency X rays at a patient's bedside."

Equipment for administering fluids to infants included open flasks and rubber tubing. The hospital lacked emergency resuscitator bags with appropriate connections. By salvaging parts here and there, Dr. Todres and Miss Cervantes were able to fashion a usable bag.

The rooms had no climate control except for opening windows when it was hot and closing them and bundling patients in blankets when it was cold. Sanitary conditions were far from adequate with the result that the spread of infections was a common occurrence.

The MGH team devoted much of its days at the Hangzhou hospital to teaching. Morning rounds with the staff were followed by lectures and more discussions with demonstrations at the bedside of special techniques. Either an English-speaking staff member or a representative of the Chinese Foreign Office helped the visitors overcome the language barrier.

During more than two weeks in China, Dr. Todres visited a major teaching hospital in Shanghai to advise on establishment of a pediatric ICU for postoperative cardiac patients.

Contrasts in medical care were very marked. In one area of the hospital, for example, medical techniques resembled American practices of a generation ago. Yet not far away in the same institution, one found patients who had undergone bone marrow transplantations, a technique that is a medicine of the 1980s.

In conducting surgery, the Chinese are relying more on anesthesia and less on acupuncture. Dr. Todres, who is also Associate Professor of Anaesthesia (Pediatrics) at Harvard Medical School, said his Chinese colleagues realize that modern anesthesia is more effective and reliable.

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cent years far outstripping that of proprietary drugs, many brand name companies are putting out generic duplicates of their own patented products for sale under other company labels.

In a further effort to stay competitive, some firms even produce what are described as "brand name generics." Sold as a chemical equivalent, the drug still bears the maker's own well-known name somewhere on the package. With this symbol of quality and reliability serving to attract buyers, the manufacturer can usually sell its product at a price somewhat higher than the typical generic medicine.

Last year, Congress passed legislation designed to speed the introduction of low-cost copies of brand name drugs, but efforts to iron out slight differences in House and Senate versions bogged down in committee.

The plan sought to clear away market barriers to generic drugs already found to be safe and effective in the patented form. In return, the companies whose research yielded the drugs would have had their patent rights extended.

Patents now remain in effect for 17 years. However, the clock starts ticking very early. Seven years or longer may elapse between the time work begins in the laboratory and the product is ready for marketing.

With millions of investment dollars to recoup, pharmaceutical firms must pump up the price of their drugs during the remaining time they have for claiming exclusive selling rights.

"So long as we want the faucet of new agents not to be turned off, there has to be financial incentive to do the research," Dr. Rosow said. Mr. DeMonaco added:

"Severe losses on that front would eventually negate the public's price breaks from generics. After all, if no new products reached the market, there would be little for the generics industry to emulate. It's a tough issue all around." ■

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China's Health Care Needs Remain Great

(Concluded from Page 7)

"This does not mean that there no longer are reasons to employ acupuncture," he declared. "Many doctors in China simply have not yet developed the skills to use anesthetic agents."

Dr. Todres' 1983 visit to China was devoted to learning where gaps exist in that nation's health care for infants. Later, at Project Hope headquarters in Virginia, he worked closely with Dr. John Kattwinkel, a neonatologist, on how to set up neonatal ICUs in China.

Appeals by Project Hope led to an outpouring of monetary contributions, equipment donations, and other assistance which had an immediate beneficial effect overseas.

"When we first visited China, very little was being done for the critically ill newborn other than to keep the baby as warm as possible, often difficult to do in the very cold winters, and to provide nutrition," the MGH pediatrician said. "Antibiotics could be given to quell infections, but if a baby was having severe respiratory difficulties and required a respirator, there just wasn't one around."

In addition to such equipment, state-of-the-art devices shipped to China included electrocardiographs (EKGs) to record the heart's electrical activity, blood pressure instruments, special pumps to infuse exact quantities of fluids, and monitors for checking oxygen levels in the blood.

Project Hope has sent physician-nurse teams to China to teach new patient care programs. Each doctor spent one month overseas, each nurse two months.

A lack of sufficient financial resources in China has been a key stumbling block in the government's effort to raise medical care to western standards. Inexperience in buying new equipment has also presented the Chinese with a problem.

Miss Cervantes said that at Hangzhou, where she worked last April and May, expensive, sophisticated machines stood idle because supplies of disposable products needed to operate the equipment ran out, and replacements could not be obtained easily.

As the Chinese shift increasingly toward western medicine, their own style of health care still occupies a major role in hospitals. Many babies admitted to the center at Hangzhou, for example, suffer from excess blood levels of bilirubin, a liver waste product, accompanied by jaundice. Premature birth can cause this condition.

"In addition to phototherapy [exposure to lights], the babies are fed a blend of Chinese herbs in sugar water, one ounce twice daily," Miss Cervantes said. "It's believed that the herbs absorb the excess bilirubin and carry it out of the body via the stool."

Because many babies are born in China amid poor surroundings, the infants are often cold and prone to develop a potentially lethal condition called sclerema (a hardening of fat under the skin).

"In the United States, the mortal danger to infants posed by cold was recognized back in the 50s," Dr. Todres said. "Also, in China they don't have adequate transport systems to speed a patient to the hospital. With modern facilities, many of those babies could be saved."

In the Hangzhou hospital's intermediate care unit, children suffering from failure to thrive predominated. Miss Cervantes said that outside the major cities many mothers just do not know how to feed their little ones properly and what to do when they vomit or develop diarrhea.

In the spring, Project Hope will send more physician and nurse volunteers back to China to continue the efforts of their predecessors in promoting modern medical practices. At the same time, in a further gesture of friendship, the MGH expects to welcome and train a physician and a nurse from the Hangzhou hospital. ■

Using a doll, MGH staff nurse Althea Cervantes demonstrates at Hangzhou, China, how CPR (cardiopulmonary resuscitation) should be applied to an infant.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 1 January–February 1986

New Group Practice Meets Women's Health Needs

Control of Prostate Cancer Improves

A form of cancer that strikes four of every five men by 80 years of age appears to be responding to new methods of treatment.

The American Cancer Society reports that 86,000 men in this country were diagnosed in 1985 as having cancer of the prostate and that the disease claimed 25,000 lives. Although the total of new patients reflected a continuing annual rise, the death toll was the lowest by percentage in at least 15 years.

Once the second leading cause of cancer deaths among men, prostatic carcinoma now ranks third behind lung cancer, the leader, and colorectal cancer.

Dr. Alex F. Althausen, an MGH urologist, emphasized that a cure is yet to be found for cancer of the prostate, whose cause is believed by some to result from continued secretion of testicular male hormone. "What we have to offer," he said, "are newer treatments to palliate the disease for many and improve the quality of their lives."

The prostate gland is a walnut-sized organ situated directly under the bladder where urine is stored. The gland surrounds the urethra, the canal that carries urine through the penis and out of the body. During sexual activity the prostate secretes a fluid which helps to transport sperm through the penis.

Dr. Althausen said that the prostate enlarges progressively in most men after age 60. Urinating often becomes more difficult. A feeling may persist that the bladder has not emptied completely. The urine may also reveal some blood.

(Continued on Page 2)

Often slow to heal, the psychological injury from a sexual assault may need treatment by a trained professional. Story on Page 5

A group of physicians and nurse specialists, bridging several medical disciplines at the MGH, has established a group practice to assure more comprehensive health care for women.

At the same time, the new practice will strive to address a number of women's health problems, some major and others pesky, day-to-day complications that have never really been looked into adequately.

Called Women's Health Associates (W.H.A.), the new unit coordinates the services of internists and psychiatrists as well as specialists from the MGH's gynecological division, the Vincent Memorial Hospital.

Dr. George S. Richardson, Acting Chief of the Vincent Memorial and Director of W.H.A. Gynecology, said that to meet the health needs of women "we must look at the whole picture, not simply the professional objectives of a single specialty, such as gynecology."

One of the most important benefits of W.H.A., he said, will be clarification of many things that bother women patients, and the patients themselves will be able to collaborate with the professionals in finding ways to refine methods of care.

Dr. Karen J. Carlson, Director of W.H.A.'s internist group, said countless women visit a gynecologist once a year for a Pap test (to check for cancer of the cervix) but have no one to call for general health problems.

Trained as a primary care specialist, an internist is well equipped to look after one's general health as well as offer women such diagnostic procedures as a breast examination, Pap test, or pelvic exam (to look for other cancers, such as ovarian tumors).

How frequently the tests should be conducted often depends on a patient's age. If the doctor picks up the slightest indication

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EDITORIAL:

Consumerism and Women

Consumerism was slow in reaching health care. But there were striking exceptions. Like Paul Dudley White, who is described on Page 7 in an entirely different context. Most physicians, when explaining a health care problem to interns and residents at bedside, face the young physicians. By contrast Dr. White faced the ill rather than the doctors and made the patient the focal point of attention. People responded to that sort of courtesy and were fond of the late MGH cardiologist.

Maybe Dr. White's custom derived from the era of house calls when consumerism in health care really began. That was when medicine was simple because physicians had few answers and lots of friendly conversation. Technology added greatly to the doctor's knowledge but drove a wedge between the physician and patient. When Dr. White founded MGH cardiology in 1914, he had a stethoscope and a string galvanometer, a crude forerunner of the modern EKG. Now fantastic instruments like the CT scanner or the MRI interpose themselves between doctor and patient. Huge devices, they weigh and cost far too much to take on house calls. So the patient comes to the office, often in a hospital complex, and busy physicians (the good ones are very busy) have less time to devote to the nonmedical problems which may lie at the root of the patient's visit: the need for a friendly pair of ears to listen to personal problems that may have something to do with the pain in the back or the raging headache. The exploding population in bustling cities added to the burden of the medical professional as there were more patients to see and the doctor too became the victim of the blurred pace of urban society.

In women's medicine there began to arise the quiet complaint that male gynecologists were not always sympathetic to menstrual cramps or the disfigurement of a mastectomy. Then came Ralph Nader and *Unsafe at Any Speed.* Next, women, like car owners and other purchasers, began to demand "more sympathetic treatment."

Some of the complaints were exaggerated or unfair. Some are well targeted. From the charged atmosphere of consumerism flashed lightning bolts that brought about changes. It is from that background that the MGH group practice for women emerges (Page 1). It is with consummate pleasure that the *MGH News* welcomes the delivery of the newest unit to the hospital.

Prostate Cancer

(Continued from Page 1)

What precipitates the enlargement is not known, but physicians theorize, Dr. Althausen said, that testosterone—the male hormone controlling secondary sex characteristics—ultimately changes into dihydrotestosterone within the prostate, causing increased cellular growth in that gland.

The enlargement may be benign, an overgrowth of normal prostate tissue, or due to a malignancy. The average age of a patient when prostate cancer is diagnosed is 70.

A rectal examination done manually can detect prostatic enlargement. If the gland is smooth and symmetrical to the touch, cancer is uncommonly present and the overgrowth is benign. If the organ feels hard and nodular, the presence of a carcinoma is likely.

Further testing might involve use of an ultrasound rectal probe to measure the size of the prostate and more closely investigate areas in it that are suggestive of cancer. A technique such as a needle biopsy may be performed, either with local or general anesthesia, to obtain a core of tissue for microscopic examination.

A blood test revealing higher levels of acid phosphatase can help to confirm a prostate malignancy and may be used to determine response to treatment. A bone scan may be performed if suspicion exists that cancer may have spread from the gland to surrounding bones.

Dr. Althausen, who is also Assistant Clinical Professor of Surgery at Harvard Medical School, said that treatment of a benign enlargement most commonly involves a procedure called a transurethral resection of the prostate. Inserting an instrument into the penis, a surgeon trims away the excess tissue, flushing it out through the penis. Since no skin incision has been made, recovery is usually rapid.

If the size of the enlargement makes scraping through the urethra impractical, then an open surgical procedure would be conducted with the incision being made in the abdomen for removal of the overgrowth. Although this surgery proves

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Photographs: Pages 1, 4, 5, 6, Myron Daniels; p. 7, reproduced from *My Life and Medicine* by Dr. Paul Dudley White with permission of the publisher, Gambit, Inc.; p. 8, MGH Archives
Drawing: Page 3, Edith Tagrin, MGH Medical Art

more uncomfortable for the patient, the long-term results are at least as satisfactory as those of a transurethral resection.

Age takes on special significance in treatment decisions when cancer appears in the prostate.

Dr. Barbara Bassil, another MGH urologist, said that the type of prostate cancer occurring in men over 75 is relatively slow growing. "It is a less malignant form than one would find in someone younger," she said. "The older patient is more likely to die from some other cause."

Often, a urologist will decide on conservative treatment for the older prostate cancer patient who shows no symptoms of advancing disease. He may simply visit the doctor's office every three or six months for examination.

When the doctor decides on a more aggressive approach, several procedures are possible.

In the past when cancer was confined to the prostate gland, removal of the gland left patients impotent. Today, using an operation developed at Johns Hopkins Hospital within the past two years, MGH urologists may be able to remove the cancerous gland without affecting sexual potency in carefully selected patients.

Called a nerve-sparing radical prostatectomy, the procedure protects nerves that run along the right and left sides of the gland and that are involved in erectile function in the penis.

Dr. Bassil, who is also Instructor in Surgery at Harvard Medical School, said that in most prostate cancer patients the disease has already spread from the gland by the time of diagnosis. Physicians may prescribe intensive radiation treatments over a seven-week period or turn to hormonal therapy.

Hormonal treatment might include removal of the testicles (orchiectomy). These organs produce testosterone which supports the growth of cancer.

In 1943, a noted Canadian-born surgeon, Dr. Charles Brenton Huggins of the University of Chicago, found that men who had their testes removed at an early age never developed prostate cancer. He also discovered that if the testes were removed from a man suffering severe pain from spread of the cancer to bone, the pain would often end, and the patient's life span would be extended.

For these studies, Dr. Huggins (he is the father of Dr. Charles E. Huggins, Director of the MGH Blood Transfusion Service) shared the 1966 Nobel Prize for Medicine or Physiology with Dr. Francis Peyton Rous, an American pathologist who had discovered tumor-inducing viruses in chickens.

For men who do not want to undergo an orchiectomy because of the psychological trauma involved, an alternative is to take estrogen pills, specifically the female hormone DES (diethylstilbestrol).

Lowering the level of testosterone in the blood to almost zero, DES provides the same symptomatic relief as an orchiectomy. However, if the patient takes the drug for a prolonged period, he may face an increased risk of a heart attack, stroke, or blood clot in the legs.

Most male patients also find that DES causes loss of their sex drive and a swelling of the nipples.

"What we have to offer are newer treatments to palliate the disease for many and improve the quality of their lives."
—Dr. Alex F. Althausen

Another alternative to an orchiectomy is use of a pituitary hormone. An analogue (derivative) of a substance known as gonadotropin releasing hormone has demonstrated that it can prevent testosterone from being secreted by the testes (*MGH News,* September 1985).

If given daily, the drug can lower the testosterone output to castration levels. The drug is expensive, about $10 a day, and it must be administered by injection, but the big advantage is that the orchiectomy can be avoided.

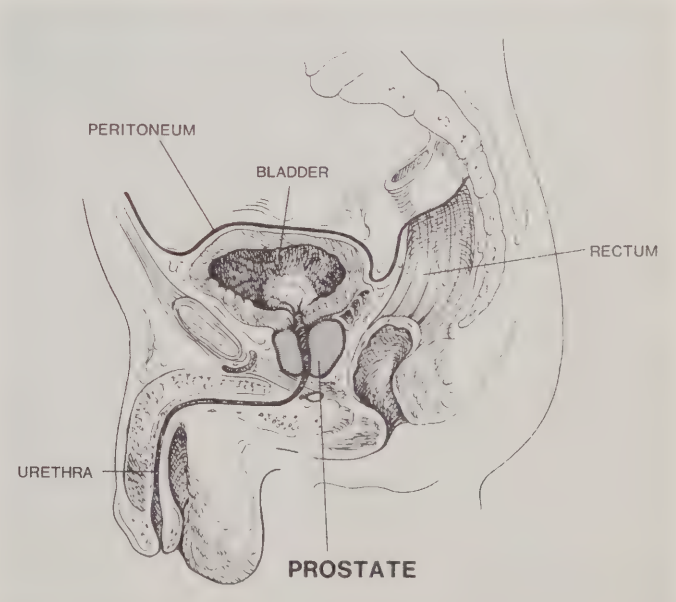
A drug presently undergoing trial at the MGH and other medical centers may become the treatment of choice for advanced cancer of the prostate. Flutamide is a nonsteroidal anti-androgen drug, which means it acts against male hormones, including testosterone. Thus, it slows the growth of prostate tumors.

In studies thus far, flutamide has proved to have a much lower incidence of cardiovascular side effects and allows most patients to remain sexually active. The drug does not have to be taken in injectable form, and there is no psychological trauma, such as would be associated with castration.

At present, in a trial sponsored by the Schering Corporation, the MGH is comparing flutamide with DES in treating patients with prostate cancer that has spread. Since it is a double-blind study (not even the doctors know which drug a patient is on), there is no indication how the investigational medication is faring, but Dr. Bassil said that in past nondouble-blind research flutamide "has certainly been as effective as conventional estrogen."

Dr. Bassil cautioned that standard hormonal treatments do not necessarily provide lasting relief from prostate cancer.

This underlies the importance of men between 45 and 50 having an annual rectal examination for detection of any abnormality or irregularity in the prostate gland. The examination takes only a minute to perform. ■



An accessory organ assisting sexual function, the prostate gland often begins to enlarge after age 60.

Dr. Anne W. Moulton of Women's Health Associates at work

Women Join in Health Care Decisions

(Continued from Page 1)

of an irregularity, the patient can be referred rapidly to a gynecologist for further studies and treatment.

Dr. Carlson said W.H.A. is focusing on women between 18 and 55 years old, the period that includes the reproductive years and the onset of menopause when fertility ceases.

"The early reproductive years can be a time when women encounter not only medical problems but also psychological difficulties," she said. "Depression and anxiety disorders are quite common in this group. Trying to maintain a marriage, raise children, and keep a house running with active involvement in a career can pose stresses that require the assistance of a psychiatrist."

All of the psychiatrists affiliated with the W.H.A. are women. Many face some of the same issues confronting the patients.

"The collaboration between the medical and psychiatric staff will be very important," Dr. Carlson said, "in deciding which problems are physiological and which psychological."

Commenting on menopause, Dr. Richardson said that almost every woman tells of a different experience.

"We don't know why the menopause differs from one patient to another, but clearly we must pay attention to this," he said. "Some women do need treatment especially devised for them.

"By networking the services of internists, psychiatrists, and gynecologists, as well as specialists in reproductive endocrinology, we are in a position to offer a superb program to address this."

Traditionally, physicians have made all of the decisions, and some patients have felt that was best. But today's patients include an increasingly well-informed, well-educated group who want to participate in their own care. The W.H.A. program makes that possible.

Dr. Carlson said one of the classical decisions that women face during menopause is whether to take estrogen replacement therapy.

Colposcope, being used by Nurse Specialist Martha Marean, permits magnified examination of a patient's cervix and vagina.

"There are some good things about it," she said. "For instance, it prevents women from getting osteoporosis [a thinning of bones]. But there are some bad things about it. For one, it's associated with an increased risk of developing endometrial cancer [involving the lining of the uterus].

"So women have to face decisions that involve their personal values. Would they rather risk a weak back or risk cancer? We want to help women weigh the choice so they can participate in a decision that is right for them."

Urinary tract infections (UTI) are a common problem for women, and there is much rethinking on how best to treat such disorders. Women's Health Associates wants to study some new techniques for diagnosing UTIs early, for treating them in a way that causes the least amount of adverse side effects, and for identifying methods of prevention.

Currently, the standard method of handling a UTI is to order a urine culture and put the patient on drug treatment for a week. Dr. Carlson said that in about 90 percent of the episodes the culture, which is costly, provides unnecessary information, and the treatment can lead to such adverse side effects as an allergic skin rash or an inflammation of the vagina.

"In recent years, an alternative treatment has been available which is much cheaper, causes fewer adverse side effects, and is almost as effective," Dr. Carlson said. "It involves a single dose drug treatment. Physicians are a bit hesitant to prescribe this method because they don't know whether the treatment can eliminate the infection permanently. By following our patients carefully after giving them single dose treatments, we would gain important information about the natural history of the disease, as well as test the effectiveness of a cost-saving clinical approach."

Vital information on another disease may also result from following W.H.A. patients. In recent years, a number of viruses, called papilloma viruses, have been associated with lesions in the cervix that are thought to be precancerous. Because of their recent discovery, nobody really knows whether these lesions later become cancerous.

Dr. Carlson said that by careful periodic examinations, including referral to specially qualified gynecologists for a technique for looking at the cervix (colposcopy), physicians will learn whether these lesions become cancerous rapidly and how often they should be biopsied for microscopic study.

A more commonly occurring problem

that W.H.A. plans to conduct research on is vaginal infections. By studying the experience of W.H.A. patients, more would be understood about how these commonplace problems develop and how best to diagnose and treat them.

Dr. Richardson said that physicians are dissatisfied with present treatments for vaginitis, or inflammation of the vagina, because it commonly recurs and "the same patients have to see us again and again."

Dr. Richardson, who is also Associate Professor of Surgery at Harvard Medical School, said his department is now culturing an organism called gardnerella as a likely cause of vaginitis. But he added that gardnerella is probably just a little red flag in an infection that also involves other germs.

Women's Health Associates contemplates studies in such other areas as osteoporosis prevention and breast cancer screening.

Patient visits to the new unit for total health care make possible the in-depth studies of many conditions. Unless specifically referred to a specialist in another part of the MGH, a patient will need to come only to the W.H.A., even if she has several problems. When health care becomes diffused, problems are more likely to be missed.

Women's Health Associates is situated in Suite 537 on the fifth floor of the MGH's Wang Ambulatory Care Center. Physicians can be seen by appointment Monday through Friday from 8 a.m. to 5 p.m., and Tuesday and Thursday evenings from 5 to 8.

Attending a planning conference for Women's Health Associates are, left to right, Nurse Specialist Lynn Bisbee, Program Coordinator Susan Winslow, Dr. Karen Carlson, Internist Group Director; and Business Manager Janis Hersh.

Internists include Drs. Carlson, Michael J. Barry, Anne W. Moulton, Albert G. Mulley, Nancy Rigotti, and Katharine K. Treadway, all also members of the hospital's General Internal Medicine Unit; and Dr. Rachelle Halpern of the Endocrine Unit.

With W.H.A. from gynecology, besides Dr. Richardson, are Drs. Masha Etkin, Jacquelyn Loughlin, and Nanette Santoro; also Clinical Nurse Specialists Martha Marean, who is also a colposcopist in the Dysplasia Unit of the Gynecology Service, and Lynn Bisbee.

From the Psychiatry Service are Drs. Edith Geringer, Stephanie Hruska, Peggy Warren, Carol Wool, and Kathleen Ulman, Ph.D. ■

Helping Sexual Assault Victims to Recover

It happens every day in Boston to people of all ages, even infants, and between acquaintances as well as total strangers.

One of the most serious crimes in society, rape is also one of the most rampant. Police say that the approximately 450 sexual assaults reported in the city each year represent only a fraction of those committed.

In the MGH Emergency Ward (E.W.), specially trained nurses care each year for approximately 75 people who have been sexually assaulted. The nurses provide important psychological help to the victims.

There is no such person as a typical rape victim. If a common denominator exists, it is that the person assaulted was accessible and vulnerable.

MGH Psychiatric Clinical Nurse Specialists Gail Pisarcik Lenehan, RN, MS, CEN, CS, and Patricia Mian, RN, MS, CS, say that most women who are assaulted experience a confusing and intense mixture of emotions—fear, vulnerability, anger, and disbelief—and they sometimes feel that actions of their own somehow contributed to what happened.

A woman, about 30, whom a man attacked after he smashed down the locked door of her apartment in Boston's North End, attributed the rape to having "lived in the fast lane."

The intended victim could have been anybody, the MGH clinicians said. Still, her attitude was helpful to her. As unrealistic as the self-blame was, it had the positive effect of producing a sense of control.

The patient vowed to change her lifestyle. This will never happen again, she told herself. At once, she felt a semblance of relief.

A rape can be committed at any time and in almost any setting. A woman in late middle age entered the foyer of her Beacon Hill apartment house one day at around 4:30 p.m. A man followed close behind, sexually assaulted her, stole her money, and ran off. People may have been walking along the sidewalk just a few feet away.

One evening, in an office building on downtown State Street, a business executive attacked a cleaning woman. Because she spoke no English, the man thought she would forget the incident and he would be safe. But she had English-speaking friends who enabled her to obtain help and to report the matter.

The City of Newton, a few miles west of Boston, was plagued for a time by a young man who repeatedly raped. He would watch particular women, jot down the number on their auto license plates, find out where they lived, go there, attack them, tie them up, and take pictures. One victim was the wife of a professional basketball player, another a doctor's wife. The assailant, eventually caught and sent to prison, turned out to be a lawyer.

In the case of children, the perpetrator most often is someone they know, possibly a babysitter, a relative, or a man living down the street who may have a model train set or some similar attraction

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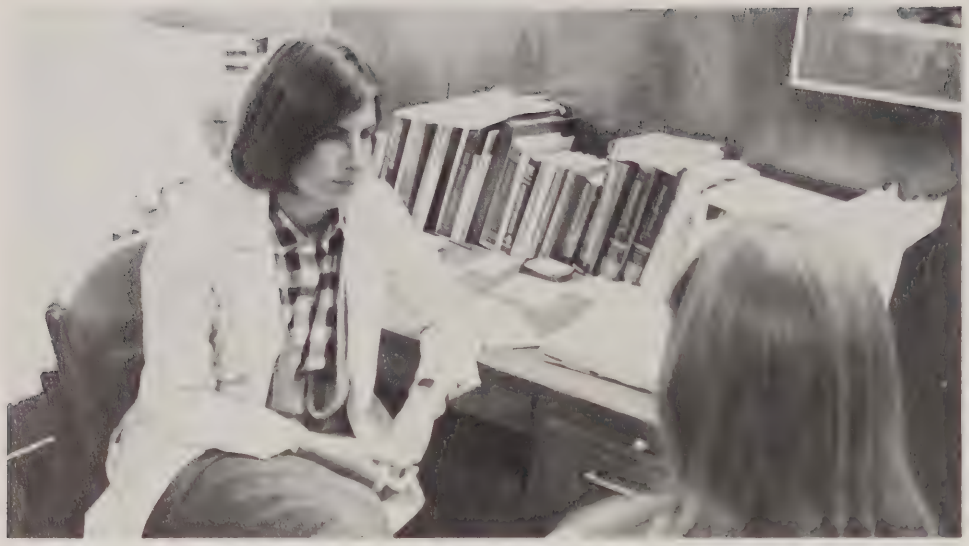

Psychiatric Nurse Specialist Patricia Mian counsels an attack victim.

Many Sexual Assaults Go Unreported

(Continued from Page 5)

with which he can lure a youngster into the home.

Mrs. Lenehan, who has counseled rape victims for 12 years, the last 5 at the MGH, said most women who seek help in a hospital emergency department have been assaulted by strangers. People are less inclined to seek help when sexually assaulted by someone they know.

The MGH clinicians said they hear more and more of so-called date rapes, but these incidents usually go unreported officially. Although these women have been left confused, upset, and even enraged, they are apt to feel that since they were with a man by choice, authorities might not believe that the date suddenly turned into a Mr. Hyde.

While rape victims do not fall into any typical classification, rapists can be categorized. The MGH nurse specialists described four types delineated by Dr. Nicholas Groth, a psychologist formerly with the Massachusetts Correctional Institution at Bridgewater.

The man whose relationships with women have been characterized by irritation and anger. He thereupon seeks out a female stranger to vent his anger. Brutalizing her far more than necessary, he may admonish, "There . . . How do you like that. That'll teach you a lesson."

The antisocial individual. If he breaks into a home to loot it and a woman is present, he feels no compunction about attacking her. He takes what he wants when he wants it.

Attackers who kill or maim. Seeing people suffer arouses their passions.

The assailant who has doubts about his sexuality. He thinks he may be homosexual and needs to prove that he is not.

The last type of rapist is the one who is most likely to be caught. He isn't sadistic. He wants the woman to be impressed and even invite him back. If she agrees, to help authorities catch him, he may actually return.

Since sexual assault comes under the heading of a medical emergency, doctors and nurses in the E.W. deliver prompt physical and emotional care. Their sole concern is the welfare of the patient. Whether the woman's complaint of rape conforms with the legal definition of the offense is a matter for the legal system, not health care professionals, to decide.

When the patient arrives in the E.W., a nurse escorts her to a room where she feels safe and can talk more freely about the assault. Some decisions weigh heavily on victims' minds: Should they report it to police? Whom should they tell and how?

The patient may have varying requests. Some women may simply ask for a tranquilizer and to go home. Others may request a full medical examination to guard against possible infection and pregnancy. At the same time, with the patient's permission, evidence helping to prove that an assault had taken place is usually gathered.

"We encourage a person to consider having us collect evidence," Miss Mian said, "because often people vow while under stress that there is no way they will go to court and then later might possibly decide to press charges, feeling compelled to protect others."

She told of a restaurant worker who dated a customer and was attacked. Convinced that her employer would kill him if he ever showed up again at the restaurant, and in light of other overwhelming stresses, the woman withheld a formal complaint. A few weeks later, the man reappeared, her boss did nothing, and she learned from others that the attacker had committed previous assaults. She then went to the authorities and filed charges.

In Massachusetts, compensation is available to victims of violent crimes, including rape, if the crime is reported to the police. The compensation can be for medical expenses, lost wages, and the cost of counseling and emergency housing.

All staff nurses in the E.W. are skilled in offering acute crisis intervention to people who have been sexually assaulted. The psychiatric clinical nurse specialists offer ongoing, or follow-up, counseling.

The psychological injury suffered by

In the MGH Emergency Ward, Psychiatric Nurse Specialist Gail Lenehan, third from left, discusses rape counseling protocol with, from left, staff nurses Ines Luciani, Ann Stangby, and Kathleen McDonald.

Dr. Paul Dudley White, second from left, with several Russian colleagues at the First Annual Congress of the Soviet Society of Cardiology. At extreme left is Dr. Yevgeni Chazov, cofounder of the physicians' group awarded the 1985 Nobel Peace Prize.

Remembering a Pioneer of Peace

He's been gone for a dozen years now, but the spirit of Dr. Paul Dudley White was in Oslo, Norway, last December as a Boston-based group accepted the 1985 Nobel Peace Prize.

The International Physicians for the Prevention of Nuclear War, cofounded in 1980 by Dr. Bernard Lown of Harvard Medical School and Dr. Yevgeni Chazov of the Soviet Union, was awarded the prize for "creating an awareness of the catastrophic consequences of atomic warfare."

Thirty years earlier, Dr. White, the founder of the MGH Cardiac Unit, by involving himself in many activities aimed at fostering international cooperation among physicians, helped pave the way for this pioneering peace effort.

In 1954 he helped found the International Society of Cardiology and in 1957 the International Cardiology Foundation. Dr. White emphasized peace through cooperation rather than concentrating exclusively on the prevention of nuclear war.

"Such cooperation was a radical idea in those days," recalled Dr. Allan L. Friedlich, Dr. White's cardiologist and longtime friend. "It was not popular to try to bring physicians from the United States and the Soviet Union together to establish a dialogue."

Dr. White also found himself in the delicate position of becoming involved in world affairs while at the same time serving as a physician to President Dwight Eisenhower, following the Chief Executive's first heart attack in 1955.

But Paul White was more interested in peace than popularity. Although the issues dividing nations were complex, his philosophy was quite simple. "The human body," he once wrote, "is truly interna-

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the victim may be slow in healing. The woman may need the support of specialists like Mrs. Lenehan and Miss Mian for some time.

They offer counseling tailored to what the individual specifically needs. Some people just want to be seen once or twice to help them figure out how to tell their family or others what happened and make immediate decisions about what else to do. Other patients present more complex problems.

If people want to call and just ask questions or talk on the phone, they can. Or they might want to be seen once a week for an indefinite period.

The nurse specialists provide an important source of support if a patient decides to press charges against an assailant. Tremendous pressures accompany the various legal proceedings, e.g., probable cause hearing, grand jury action, and superior court trial.

"Not every woman makes it through the legal process," Mrs. Lenehan said. "At some point, harassed and beaten, she may justifiably feel that she has suffered enough and quit."

In Mrs. Lenehan's experience, the entire court process averages one year. During that time, the person who has lodged the rape charge lives in a constant state of fear and vulnerability.

"Though the odds still greatly favor the assailants going free," Mrs. Lenehan said, "changes in our laws are improving the situation. People in general are also becoming more aware that sexual assault can happen to anyone and that those who are victimized need the help and understanding of us all." ■

A Few Words of Caution

With accessibility and vulnerability key factors in the perpetration of rapes, Lt. Margaret O'Malley of the Boston Police Department's Sexual Assault Unit recommends the following safety steps for women:

- If you live alone, list only your last name and initials on your mailbox and in the telephone directory.
- If someone knocks, ask who the caller is before opening the door. A peep hole permits safe checking of identification.
- When driven home after an evening out, ask the driver to wait until you are inside.
- Leave a light on at night outside the front door to facilitate re-entering.
- If you return home and see that a window has been smashed or a door forced open, do not enter but call the police from a neighbor's phone.
- Whenever possible whether driving or walking, use streets that are well traveled.
- Keep the car doors locked while driving to prevent someone from jumping in at a traffic light or other stop.
- If you think a stranger is following you in another auto, don't drive home. Instead, drive to the nearest well-lighted public area and call for help.
- Before entering a parked vehicle, make sure no one is hiding inside.
- While walking in a relatively quiet neighborhood, avoid passing close to bushes, doorways, or parked cars which could serve as hiding places.
- And even if it seems like eternity waiting for public transportation, never hitchhike!

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Dr. White Won Many International Honors

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tional, and the basic rules of health apply everywhere in the world."

Dr. White met many medical leaders of the Soviet Union, including Yevgeni Chazov. Their warm friendships would continue through the era of cold war.

To the MGH cardiologist, there was only one enemy. "Heart disease," he said, "knows no political, religious, or geographical boundaries, and only through international communication can this common threat be conquered."

In addition to those in the Soviet Union, Dr. White established relationships with many other countries in the world. His mission for peace took him to virtually every place where there was conflict—Greece, Italy, Israel, Egypt, Pakistan, and India, to name a few.

Among his many international honors were a decoration from the Government of Greece, the Legion D'Honneur of France, Honorary Professor of Medicine, Santo Tomas University in Manila; Fellow of the Royal College of Physicians of Ireland, and membership in the Soviet Academy of Medical Sciences, the first U.S. citizen ever elected to that body.

In 1971, he was also one of the four original American physicians to visit the People's Republic of China. Physicians from China returned the visit to the MGH and other American hospitals a short time later.

For his many efforts toward world peace, the cardiologist was awarded the "Gold Stethoscope" by the International Cardiology Foundation. And in 1970 he was nominated for the Nobel Peace Prize.

One of his most enthusiastic supporters in this effort was his colleague and friend, Professor B.W. Petrovsky, Minister of Health of the Soviet Union.

Wrote Professor Petrovsky, "To the scientists of the USSR, Professor White is widely known as an outstanding scientist-cardiologist, most wonderful humanist, determined fighter, who devoted all his long and fruitful life to the fight of very dangerous diseases, and to tighten the feelings of friendship, common respect, and cooperation among the scientists and doctors of different nations. . . . In my opinion, Professor P.D. White is the most suitable candidate for any kind of international distinction for his great contributions."

Other sponsors included scientists from Poland, Pakistan, Israel, and more than 20 other nations. Just being nominated for the Nobel Peace Prize seemed to justify Dr. White's exhaustive efforts for world peace.

The nomination, in part, read, "Among physicians as well as leaders in many other fields of endeavor, he is recognized as an outstanding international statesman. . . . He truly personifies the role of medicine as a peacemaker. . . . His example stands as a beacon for all men of conscience and competence."

Paul Dudley White did not win the Nobel Peace Prize. If he was disappointed, he didn't show it. An optimist by nature, he was a firm believer that, in the end, peace would win over war if people just had the opportunity to meet and resolve their differences.

Dr. Friedlich, his long-time friend and cardiologist, said that Drs. Lown, Chazov, and the others have done an enormously effective job of highlighting problems and especially in dramatizing the possibility of nuclear warfare in a way that has brought physicians from around the world together.

"If Dr. White were alive today, there would be a big smile on his face," remarked Dr. Friedlich. "He worked so hard to attain peace in the world that the 1985 Nobel Peace Prize is a kind of vindication of his efforts. It would have made him so happy and proud of Drs. Lown, Chazov, and the physicians of the world who are taking a leading role in the prevention of nuclear war." ■

In 1953, Dr. Paul D. White with Dr. Yang Wang, the first Paul D. White Clinical Fellow in Cardiology at the MGH, sponsored by the Massachusetts Heart Association

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 2 March 1986

A New MGH Milestone Stirs Thoughts of the Past

Cystic Fibrosis: The Odds Get Better

Thirty years ago, a child born with cystic fibrosis (CF) had only a 50–50 chance of reaching one year of age.

With the passing of time, better understanding of the disease, improved management techniques, and the development of highly effective antibiotics have brightened the survival prospects of CF victims.

Today, on one floor of the MGH's Baker Building, pediatricians and specially trained nurses care for CF patients who are no longer children but range in age from 20 to the mid 40s.

Although pulmonary disease constitutes the major threat to their lives, most people afflicted with CF who visit the MGH's Wang Ambulatory Care Center (ACC) for checkups present a picture of contradictions.

"We can spend an entire afternoon seeing CF patients in the ACC without detecting a single abnormal chest sound," said Dr. Allen Lapey, who codirects the hospital's Cystic Fibrosis Center with Dr. Kon-Taik Khaw.

"We see healthy people with healthy lungs walk through here. These individuals have cystic fibrosis, but it is well controlled."

On the research front, scientists in the United States, Canada, and England have discovered markers pointing out the presence of the gene that causes the disease. These recent discoveries raise the prospect of tests soon to detect CF before birth and even identify carriers of the faulty gene. While not afflicted with the active disease, a carrier may pass the

(Continued on Page 6)

Eight years after a tumor developed in Maria Sousa's right jaw, the growth reached grapefruit size, but surgery at the MGH restored her normal appearance. Story on Page 2

"One does not reckon the age of an institution in years so much as in adaptability to progress."

One of the great neurosurgeons of his day, Dr. Harvey Cushing, was speaking in 1921 at ceremonies marking a century since the Massachusetts General Hospital opened its doors.

"What we are to celebrate today," he said, "is the birthday of a hospital ten decades young, not old—a hospital which has not slipped back from the ideals and enthusiasms of its founders nor shown any tendency to become hidebound in the course of years by the very past which ennobles it."

This month the MGH is again looking back, over yet another 75 years. It was on February 25, 1811, that the Massachusetts legislature granted a charter to the MGH. Throughout the 175 years that have elapsed since that notable day, the words of Dr. Cushing have rung true. The hospital has never "slipped back."

A pioneer of medical progress in early America, the MGH—the third oldest private, nonprofit, general hospital in the United States and the oldest in New England—has remained a pacesetter in health care, forging ahead not only at home but also on a global front.

To commemorate its founding, the MGH planned daylong festivities on February 25, including a series of talks by distinguished practitioners and researchers on the theme, *Profiles in Patient Care: 1811–1986.*

Former President John Adams served as moderator at the first meeting of the MGH Corporation, but the War of 1812 initially slowed both construction of the hospital and its fulfillment of mandates which had sparked the project.

These mandates were: provide care for the sick and infirm, serve as the first

(Continued on Page 3)

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EDITORIAL:

Of Matters That Change—or Don't Change

William Henry Harrison defeated Indians in the battle of Tippecanoe. The year was 1811, and Harrison was one day to win the Presidency with the campaign slogan of "Tippecanoe and Tyler too." In 1811 a former President, John Adams, moderated the first meeting of the MGH Corporation. The new hospital grew slowly and New England conservatively. The two physician founders became early deans of Harvard Medical School. They also founded a medical publication that would one day become the *New England Journal of Medicine.*

James Jackson, the first Chief of Medicine, and John Collins Warren, the first Chief of Surgery, nurtured the infant hospital each in his own way. Jackson railed against the bloodletting panacea still in vogue in Philadelphia for treating a variety of ills. A warm and kindly man, he helped establish a tradition of *caring* for patients in both the medical and interpersonal sense.

Warren was an austere man whose scientific curiosity wandered productively in fields other than medicine. But his name will forever be associated with one operation that scarcely taxed his surgical skills. For it was he who risked his reputation as perhaps America's foremost surgeon to demonstrate to the world operative anesthesia.

What would Warren and Jackson think of the MGH now observing its 175th anniversary? They would wonder at the hundreds of thousands of square feet of corridors; at its 8,000 plus employees (about one quarter the number of the entire population of Boston in 1810). They would marvel at a hospital that transplants livers, hearts, kidneys, and bones, and replants limbs. They would blink at surgeons who create thumbs from toes and artificial skin to save burned patients. And they would be startled at the knowledge of physicians and their command of a nonsurgical arsenal to prevent, diagnose, and cure disease. Yes, they would be amazed at physicians with minds brimming with data like computers and at computers learning to analyze like physicians.

And in the midst of these marvels they would still recognize some things. Like the Bulfinch Building they helped open. True, the mouth of the Charles River now flows too distant for patients to arrive any more by boat. Inside the Bulfinch—and in other, unfamiliar structures—they would recognize physicians. No, not the faces they once knew, but the familiar bustle of activity; the patient rounds in the morning; the concern over an elderly woman nearing the end of her days; the laughter of a child snatched from the jaws of death; the determined look of a doctor trudging the corridors long, long after the sun has plunged beyond the horizon; the dedication of so many professionals and nonprofessionals alike to the good of the patient; the joy of teaching and learning from the young physician; and the rapture in a discovery that will help patients all over the world. Some things never change—not even after 175 years.

A Facial Operation Redirects the Path Of a Woman's Life

The love of a New Bedford family for a woman relative they had not seen in 19 years has enabled her to obtain medical treatment at the MGH and end years of living in virtual seclusion.

Maria Carreiro Sousa, who lives on the island of Sao Miguel in the Azores, once again can leave her small farm to attend church, to shop, or to simply stroll along a street. No heads will turn to stare. No longer will people talk about her.

For five years, the 65-year-old Portuguese mother of four married children felt ashamed to go outdoors because of a massive tumor which developed in her right jaw and grew to the size of a grapefruit.

In a six-hour operation that necessitated special care to avoid harming nerves governing facial motion, Dr. G. Gregory Gallico III of the MGH Plastic Surgical Division removed a block of bone that covered the right side of Mrs. Sousa's face from the tip of her jaw to her ear.

"Her face is now back to normal size, and healing has progressed nicely," Dr. Gallico said. "Mrs. Sousa has even obtained new dentures, making it possible for her to eat solid food for the first time in years."

He described the tumor as an ameloblastoma, an uncommon growth which has a marked predilection for the jaw but constitutes only one percent of all tumors and cysts involving the jaw.

Usually benign, the tumor affects males and females and occurs in all age groups; however, the peak incidence is in the third and fourth decades of life.

Mrs. Sousa was about 35 years old when her problems began. A dentist in the Azores extracted one of her teeth, and recurrent infections followed. About eight years ago, she was advised to have all of her teeth out. Shortly after she took this advice, she said, the tumor began growing in the jaw, swelling her face.

Doctors in the Azores tried to treat the problem with drugs, but they were ineffective. The doctors ruled out surgery because if any damage resulted to the

Photographs: Page 1, courtesy of Dr. G. Gregory Gallico III; p. 3, Scott Davis; p. 4, MGH Photo Lab; pp. 5 (upper), 6, 7, Myron Daniels; p. 5 (lower), MGH Archives; p. 8, courtesy of Dr. H. Arthur Berson

MGH Skills Attract Patients Worldwide

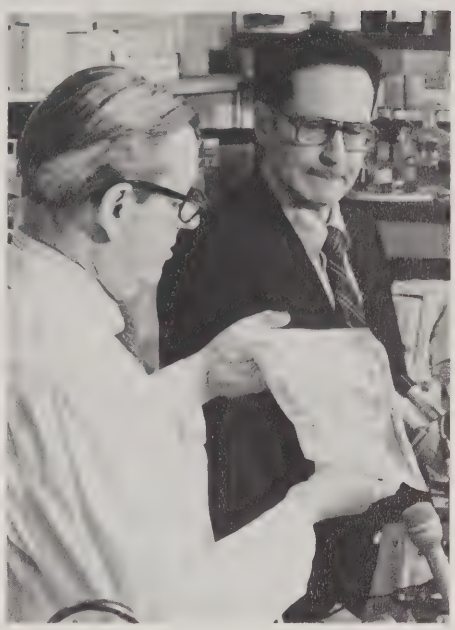
(Continued from Page 1)

hospital training ground for students of Harvard Medical School, and expand medical knowledge through research.

Drs. John Collins Warren and James Jackson, who led the campaign for the hospital, became its first Chief of Surgery and Chief of Medicine, respectively, when the first MGH structure, the Bulfinch Building, opened in September of 1821.

Nineteen patients were admitted during the first four months and a total of 122 the following year. Today, the hospital, comprised of nearly 20 buildings on its main 13½-acre campus, records nearly 31,000 admissions yearly and treats more than a half million additional patients on an ambulatory basis.

The General Hospital Corporation also embraces McLean Hospital in Belmont, a world-renowned psychiatric division which first opened its doors in Somerville in 1818; the 284-bed Spaulding Rehabilitation Hospital, situated close by the MGH; Vincent Memorial Hospital, which serves as the MGH's gynecological division; and community health centers in Chelsea, Revere, Charlestown, and at



Dr. John F. Burke of the MGH and Prof. Ioannis V. Yannas of M.I.T. displaying newly developed artificial skin in 1981

Boston's Logan International Airport.

The Shriners Burns Institute, famed for its free care of severely burned children and situated across the street from the main MGH campus, is staffed by MGH doctors.

Some 80 percent of the Mass. General's patients live within 40 miles of Boston. The remainder come from throughout the world, attracted by the MGH's longstanding reputation for excellence in overcoming difficult medical challenges.

The number of interns, residents, and fellows in training at the MGH at any one time exceeds the total student enrollment at Harvard Medical School. In 1980, the MGH also established on its campus a degree-granting Institute of Health Professions, dedicated to preparing clinical specialists in nursing and a variety of other health professions.

"The presence of so many bright, young, inquiring minds challenges hospital staff members to deliver the best care possible," said Dr. J. Robert Buchanan, MGH General Director. "This tradition of providing the best care is one that has kept the MGH in the forefront of medicine."

Treatment of heart disease and the MGH Cancer Center's care of cancer patients account for many admissions and outpatients. But specialists lend depth at the hospital to virtually every field and subspecialty of medicine, ranging from

(Continued on Page 4)

motor nerves which were splayed out over the tumor mass the injury could cause a permanent paralysis of the face and resultant psychological harm.

As the tumor grew, so did Mrs. Sousa's ordeal.

Since the growth made it impossible for her to sleep on her right side, she would toss and turn in bed at night, rarely getting more than an hour's rest at any one time. During the day, fatigue overwhelmed her.

When she sat down at a table to eat, the increased weight of her head forced her to use one of her arms to keep her head propped up.

And whenever she found it necessary to leave her home, she always wore a kerchief or shawl to prevent her facial abnormality from being conspicuous.

"The tumor also forced her to speak very slowly," said Connie Sousa of New Bedford, who spearheaded efforts to bring Maria to the MGH. "If she spoke for longer than five or ten minutes at a stretch, she would feel increasing pain in her face."

Connie's husband, Cluverio, is one of three nephews of Maria who reside in New Bedford. She also has a brother and a sister-in-law living in that city.

Connie said the family had not seen Maria since 1967. Although they had heard that she had developed a tumor in the jaw, they did not realize the magnitude of her plight until they received pictures from Maria and her husband, Manuel.

"We were absolutely shocked," Connie said, "and we felt that we had to do something. My father had been seeing a doctor at Mass. General for cancer treatment, so I took the pictures to him and asked if he could recommend someone at the hospital who might be able to help my aunt."

The specialist in the MGH Cancer Center, Dr. Robert W. Carey, put Connie in touch with Dr. Gallico. After hearing her story, Dr. Gallico arranged for a special visa enabling Maria to travel to the United States for medical care. Soon he was meeting with her and ordering necessary diagnostic tests, including a computed tomography scan, to decide what could be done for her.

Connie said that after her husband's aunt arrived from the Azores her tumor appeared to grow faster. "We don't know what might have caused that," Connie said, "but we're sure that when she was operated on, the tumor was larger than it was on her arrival here."

Dr. Gallico said that Maria's tumor was so massive that he had to remove one half of her right jaw.

"There would always have been a chance of local recurrence if the tumor had not been taken out completely," he said. "I'm confident that we got it all."

Dr. Gallico removed only the bone tumor. Tissue which had stretched out over the tumor was rolled back to help fill in the area where the growth had developed.

"Although much of the right jaw was taken out, the symmetry of her face is quite reasonable," the MGH surgeon said. "It's possible that she may need a bone graft to restore her jawbone at some time in the future, but I really don't think that will be necessary."

Maria has only a thin scar along the edge of the jaw as an aftermath of her surgery. Dr. Gallico has assured her that the mark should fade in time.

After a week of postoperative hospital care, Maria returned to Connie's home in New Bedford. Excited over her good health, Maria now looks forward to mingling with people once again. ■

Most MGH Doctors Serve on Harvard's Medical School Staff

(Continued from Page 2)

transplantations of the heart, kidneys, liver, bone, and soon the pancreas, to operation of the world's largest medical laser research laboratory.

More than 85 percent of the physicians and surgeons at the MGH hold faculty appointments at Harvard Medical School. They also comprise a large percentage of some 300 scientists who work in 75 research laboratories at the hospital.

A long list of "firsts" in medical science attests to the wisdom, dedication, and zeal of MGH professionals. Looking at the last 25 years alone:

In 1961, employing Harvard University's unused 160 million electron volt cyclotron, Dr. Raymond N. Kjellberg, an MGH neurosurgeon, recorded the first proton beam treatment of a patient suffering a brain tumor. Dr. Kjellberg has since extended the one-session treatment to other brain conditions difficult to attack with conventional means.

In May 1962, Dr. Ronald A. Malt, then a Chief Surgical Resident, led a team of surgeons with diverse specialties in restoring the severed right arm of a 12-year-old boy. Replantation of an amputated limb had never before succeeded.

Two years later, Dr. Charles E. Huggins, present Director of the MGH Blood Transfusion Service, developed a practical way to freeze and thaw blood for long-term storage.

In 1969, a group of MGH heart specialists and engineers from the then AVCO–Everett Research Corporation developed and used an intra-aortic balloon pump to assist patients needing circulatory support. The medical group included Drs. W. Gerald Austen, now Chief of Surgery; Mortimer J. Buckley, Jr., present Chief of the Cardiac Surgical Unit; and Charles A. Sanders, a cardiologist who later served as MGH General Director from 1972 to 1981. The balloon continues to be widely used.

In 1971, Drs. Arthur L. Herbst, Howard Ulfelder, and David C. Poskanzer reported discovery of a link between the ingestion of DES (diethylstilbestrol) in pregnancy and the development years later of vaginal cancer in a small percentage of offspring of the women.

In late 1974, three MGH dermatologists, Drs. John A. Parrish, Thomas B. Fitzpatrick, Chief of the Department of Dermatology, and Madhukar A. Pathak, signaled the birth of a new field of care called photochemotherapy, a treatment combining drugs and artificial light. The first use involved a form of ultraviolet light in combination with an ancient drug to treat psoriasis.

At top, a view of the MGH in the early 1800s from a display by Simeon Gagne and, below, the hospital complex today, the pillared Bulfinch Building dwarfed by other MGH structures

Five years ago, Dr. John F. Burke, Chief of the MGH Burn Center, an adult treatment unit, and Prof. Ioannis V. Yannas of Massachusetts Institute of Technology reported development of artificial skin. Invaluable in the treatment of severe, widespread burns, the artificial skin resulted from a 10-year collaboration of medical and engineering specialists at the MGH, M.I.T., and Shriners Burns Institute.

And working with an international team of investigators, an MGH geneticist, James F. Gusella, Ph.D., reported three years ago the discovery of a long-sought "marker" to indicate presence of the gene for Huntington's disease. The hereditary disorder leads to involuntary movements, emotional disturbances, intellectual impairment, and death.

Dr. John Collins Warren set the course for the hospital's many achievements when in October 1846 he put his reputation on the line to demonstrate for the first time that painless surgery was possible with the use of anesthesia.

With a dentist, Dr. William T. G. Morton, administering ether to one Gilbert Abbott, Dr. Warren removed a tumor from the patient's neck before a gathering of medical colleagues in a surgical amphitheater now known as the Ether Dome. Mr. Abbott said he felt no pain during the procedure.

An MGH physician, Dr. Oliver Wendell Holmes, coined the term *anaesthesia* to describe what he hailed as "this priceless gift to humanity." In 1965, the U.S. Department of the Interior named the Ether Dome, which rises above the Bulfinch Building, as a National Historic Landmark. Eight years later, the agency accorded that honor to the entire building for its architecture.

In 1956, the MGH's 12-story Warren Building was dedicated to honor Dr. John Collins Warren and five other members of his family, all of whom distinguished themselves as doctors. One was Dr. J. Mason Warren, who brought the art of plastic surgery from Europe to America.

The closest rivals to the Warrens in establishing a medical dynasty at the MGH were the Bigelows. From 1836 to 1855, Dr. Jacob Bigelow ranked as the leading physician on the MGH staff. Known for his keen intellect, he was widely acclaimed by colleagues for his "Discourse on Self-Limited Diseases."

In the discourse, published in 1835, Dr. Bigelow argued that many diseases need not be treated as they would run their course and limit themselves. His

position gave people a better chance of surviving than they had when they underwent bloodletting, purges, and other drastic methods.

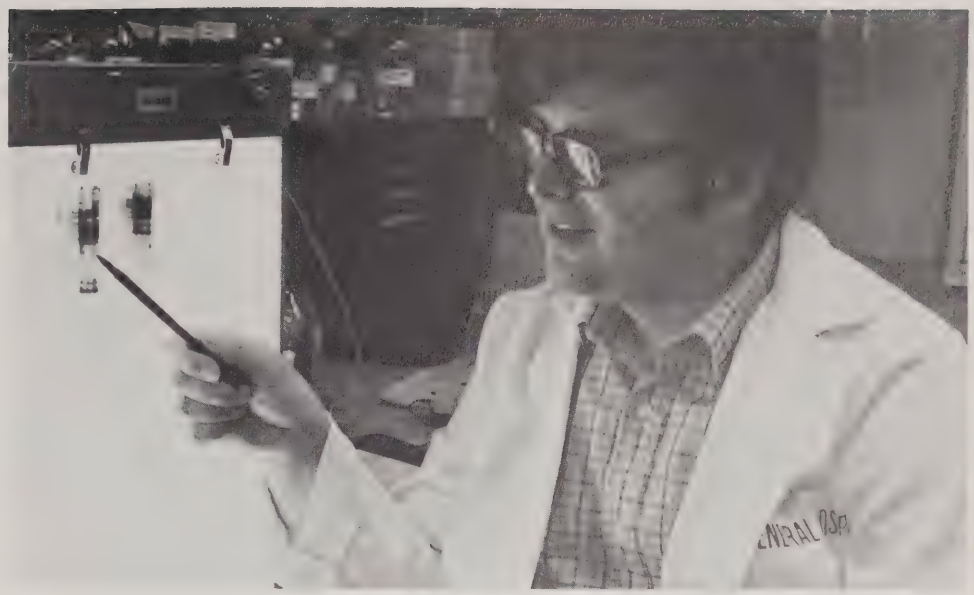
The eldest of five children born to Dr. Bigelow and his wife, Mary, grew up to become a leading surgeon of his day.

During a 40-year affiliation with the MGH and Harvard Medical School, Dr. Henry Jacob Bigelow became the first American surgeon to remove a hip joint, and he devised a new method of reducing dislocations of that joint. He also developed a safe and effective means of crushing and evacuating kidney stones in the bladder.

The only son of Dr. Henry Bigelow and his wife, Susan, followed the family tradition, attending Harvard and entering the medical profession. Dr. William Sturgis Bigelow became an MGH surgeon and a lecturer at Harvard Medical School. After his retirement, he served for 10 years as an MGH trustee.

An MGH pathologist, Dr. Reginald H. Fitz, described the true nature of the appendix in 1886, opening the way not only to a lifesaving procedure for appendicitis but also to other operations in the abdomen, then an area in which surgeons feared to intrude. Dr. Fitz originated the word appendicitis.

Ten years later, less than a month after word reached America that a German physicist, Wilhelm Roentgen, had discovered a way to photograph bones of the body, Walter J. Dodd, then the MGH's Chief Pharmacist, launched an intensive study of the new science of X rays and produced some of the first such pictures taken in this country. He later became a physician and head of what is now the MGH Department of Radiology.



As a result of studies of X rays showing variations of DNA, the chief chemical component of genes, Dr. James Gusella was able to report discovery of a long-sought marker to indicate presence of the gene for Huntington's disease.

The year 1905 saw the MGH establish the world's first hospital social service department. Dr. Richard C. Cabot, who served in the Outpatient Department, persuaded the hospital that emotional and social aspects of illness also had to be dealt with if medical treatment was to be truly effective.

In 1925, Dr. Marius N. Smith-Petersen, an MGH orthopedic surgeon, ended untold suffering when he devised a method of repairing broken hips. His procedure, employing three-flanged, six-inch-long steel nails, was particularly successful in treating hip fractures in the elderly.

In 1934, two MGH surgeons, Drs. Joseph S. Barr and W. Jason Mixter, coauthored a paper on ruptured intervertebral discs. The paper led to general use of an operation still employed to relieve low-back pain and sciatica.

A year later, while serving as a Research Fellow at the MGH, Dr. John H. Gibbon, Jr., developed and successfully tested on animals the first model of a heart–lung machine.

And in 1937, with the cooperation of M.I.T. physicists, Dr. Saul Hertz pioneered the use of radioactive iodine in conducting thyroid tracer studies, thereby helping to usher in the era of nuclear medicine.

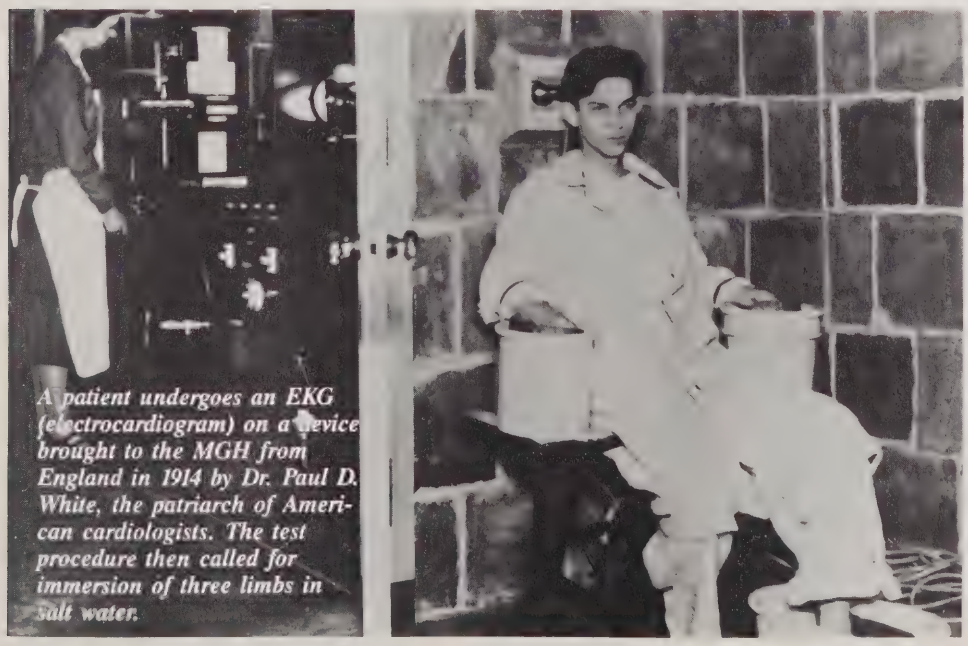
One can go on reciting MGH contributions to medicine, but no better expression of the ideals and spirit of the hospital's family can be found than in words written 40 years ago by Dr. Joseph Garland.

The late Editor of the *New England Journal of Medicine* wrote:

"The Massachusetts General Hospital, from its beginning to its present, has been served by men and women who . . . have come also to give it their affection.

"It has sought, and it has been sought by the best in the medical profession; its integrity has been guarded by a long line of devoted trustees, directors, and benefactors; by its staff, its nurses, its volunteers, its secretaries, its social service, and its employees. It has been generously supported by the community that it has helped to safeguard through so many years.

"This is the basis of its present greatness and the foundation on which its future will rest." ■



A patient undergoes an EKG (electrocardiogram) on a device brought to the MGH from England in 1914 by Dr. Paul D. White, the patriarch of American cardiologists. The test procedure then called for immersion of three limbs in salt water.

Dr. Allen Lapey checks the lungs of 16-year-old Andrea Pantalone of Marshfield, Mass., during a routine visit by her to the MGH's Cystic Fibrosis Center.

Cystic Fibrosis Hampers Breathing Tubes

(Continued from Page 1)

malady on later in life to an offspring, provided the spouse is also a carrier.

Understandably excited about finding markers, geneticists hope eventually to locate and isolate the CF gene itself. This might then lead to ways of manipulating the gene to eliminate the disease or at least make it less of a threat.

But what about those who already have the illness, the most common inherited lethal disorder affecting Americans. At least 30,000 have cystic fibrosis; an estimated 10 million are carriers.

Today, CF children have a 50–50 chance of reaching 21. Survival ranges to a higher age in major medical centers, such as the MGH where the average life span is 27 years. Of some 175 CF patients under MGH care, half are adults.

Cystic fibrosis attacks exocrine glands which produce secretions that leave the body (e.g., salivary, digestive, and sweat glands). The air-carrying tracheal and bronchial tubes are rich in mucus-producing exocrine glands that help to lubricate the tubes.

It is these mucous membranes which create the major difficulty for the CF patient.

Dr. Lapey said that the underlying defect appears to be reduced movement of chloride ions into body tissues from the cells lining the inner wall of the trachealbronchial tree. This defect precipitates an excessive flow of water out of the tubes and back into the tissues.

"The result," said Dr. Lapey, "is that the mucus in the breathing tubes becomes dehydrated and then too sticky and cannot move up and out of the respiratory tract properly. The mucus winds up clogging the lungs and leaving them susceptible to infections."

The defect in the transmembrane movement of chloride helps to explain why the sweat of CF patients is very salty. Since only a few rare conditions clinically distinct from cystic fibrosis produce elevated chloride concentrations, sweat testing has become an important step in diagnosing CF.

Better understanding of the disease in the general medical community leads to earlier diagnoses, often before devastating lung infections set in. Physicians can then turn to two groups of antibiotics which have proved to be highly effective against the organism (Pseudomonas aeruginosa) which eventually colonizes the abnormal secretions in the trachealbronchial tree and slowly causes lung destruction.

The important drugs are those in the aminoglycoside group, especially tobramycin, and in the cephalosporin class, with ceftazidime high on the list.

These drugs can also be administered in newer, more acceptable ways. In the past, it was necessary to give the medication by intravenous infusion. Thus, patients had to be hospitalized, sometimes for as long as three weeks, until their lung infections were controlled. Today, nurses often give the injections during home visits, enabling the patients to maintain normal, daily life-styles. And in a still newer development, some patients receive their medicines in an aerosol form. They simply take a mist treatment at home several times daily.

CT (computed tomography) scans provide an important assist to physicians in evaluating a CF patient who has a localized area of lung damage. CT can indicate whether the damage is beyond repair and surgery is needed to remove the involved portion to prevent spread of the infection to the rest of the lung.

A second technique, a nuclear medicine study, can also provide the desired information. Called a ventilation perfusion scan, the method involves use in the lung of xenon, a radioactive gas. Through a screened image, made possible by a gamma camera, physicians can follow the xenon. An area the gas cannot penetrate due to disease would show up as a light patch on the screen.

Cystic fibrosis originally was known as a disease of the pancreas. While the disorder does affect digestive enzymes produced by this organ, the abnormality is no longer considered a major problem because pancreatic enzymes can be taken by mouth to counteract pancreatic deficiency. Also, as the patients get older, they become more tolerant of digestive complications. Usually, the only symptom that might need special attention would be an occasional bowel obstruction.

Early diagnosis of CF does not necessarily mean that the patient is a child. Dr. Lapey, who has specialized in the treat-

A Title That Needs To Be Amended

Cystic fibrosis is a misnomer, says Dr. Allen Lapey, Codirector of the MGH's Cystic Fibrosis Center, because the term fails to describe the genetic disease in any way.

"Cystic fibrosis refers to cysts and their scarring that are seen in the pancreas under the microscope," he says. "These abnormalities are easily dealt with.

"The big problem in cystic fibrosis is respiratory. In more than 95 percent of the patients, sickness or death stems from pulmonary complications."

Dr. Lapey says the name impedes the dissemination of knowledge about this illness to the community at large.

A Medical Career Shifts Into New Gear

After a half century of medical service, Dr. H. Arthur Berson has taken down his shingle in Chelsea, Mass.

But although he is 80 years old, Chelsea's last pediatrician in private practice is not retiring. His career is only shifting gears.

Dr. Berson moved out in mid-December from a 10-room medical suite on County Road where he had practiced for the past 36 years and joined the staff of the MGH Revere Health Associates, only five minutes away by car in Revere.

"I dreaded the thought of retiring, of just closing the office and walking away," said the father of two prominent Boston ophthalmologists. "I'm in good health and feel as efficient in my work today as I did 15 or 20 years ago."

Dr. Berson realized a few years ago that his practice had grown to the point where he needed assistance. He welcomed another pediatrician into his office, but sometime later the associate accepted an offer to head an adolescent unit in a major New York hospital. Dr. Berson decided not to look for assistance again and continued to offer service to his several thousand patients.

Recently, he approached the MGH with a proposal. "I would like to transfer my entire practice and all of my equipment to the Revere unit," he said. "All I want in return is the opportunity to work in the unit for as little or as much time as I desire. I would be employed by the MGH, receiving the same compensation as other doctors in the health center."

The proposal received immediate consideration. MGH officials, including Drs. Donald N. Medearis, Jr., Chief of the Children's Service, and Roger H. Sweet, Medical Director of the hospital's Neighborhood Health Center Group, were impressed with Dr. Berson's youthful appearance and vitality.

The air-conditioned suite in which he conducted his practice reflected his zeal, dedication, and thoroughness. The suite included a large waiting room, several isolation rooms for children with infectious diseases, separate examining rooms for infants, children up to 10 years, and adolescents; treatment rooms for first aid, minor surgery, immunization, and other procedures; an X-ray unit, and a small laboratory.

Then, of course, there was the personal professional background of the man whom many have come to regard as their total physician.

A graduate of Boston University Medical School, Dr. Berson studied general medicine and surgery at St. Luke's Hospital in New Bedford, pediatric medicine at the New York Nursery and Child's Hospital, now a part of the Cornell Medical Center; pathology at Children's Hospital in Boston, and public health at the Harvard School of Public Health.

A past president of his medical school's alumni association, Dr. Berson was a dominant force during World War II in the teaching of pediatrics at the school, where he served as Assistant Professor of Pediatrics. He had earned certification by

(Concluded on Page 8)

ment of cystic fibrosis for more than 18 years, told of a patient named Jane whose condition was discovered at the MGH when she was already 20 years old and a student in college.

"There had been nothing to suggest a chronic illness until then," he said. "She saw a physician on the Medical Service because she had developed a wracking cough. That cough combined with an abnormal infiltrate that persisted on her chest X ray and evidence of nasal sinus problems brought her to our attention. The appropriate sweat test was carried out, and the CF diagnosis was made."

Today, Dr. Lapey said, Jane is a highly successful businesswoman in Chicago. The wife of a lawyer, she has remained relatively free of symptoms because of early detection and treatment.

Both Drs. Lapey and Khaw, who also serve on the Harvard Medical School faculty, emphasized the vital role of physical therapists in treating CF patients.

"In addition to getting high-dose, intravenous therapy with antibiotics, inpatients receive intensive chest physical therapy—generally four times a day—to help clear secretions from their obstructed airways," Dr. Khaw declared. "If they're ambulatory, and they usually are, the patients also are encouraged to visit the ACC's exercise therapy room and use a treadmill or a stationary bike while being monitored to see how their cardiorespiratory system responds."

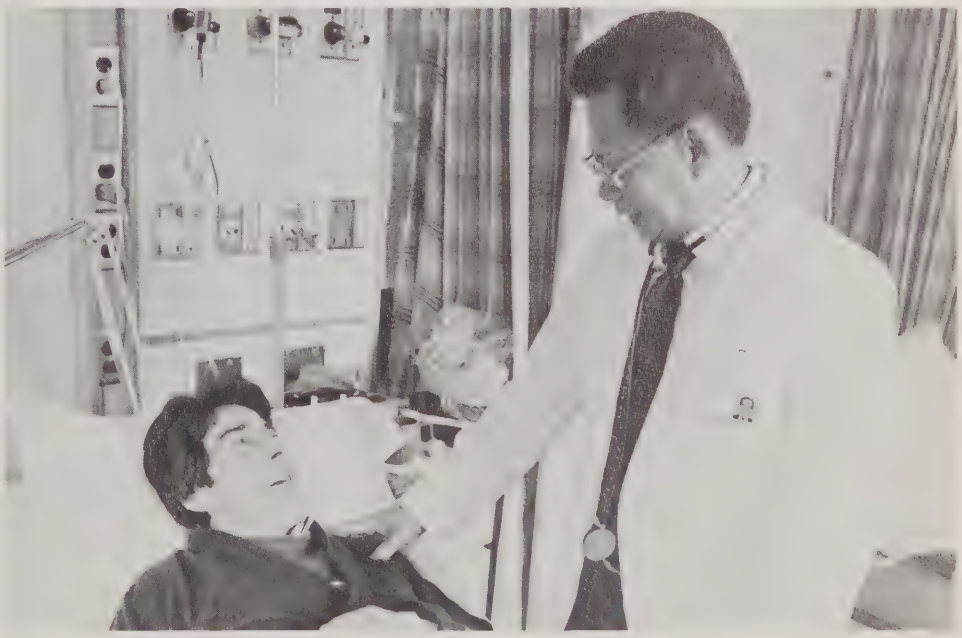
Although Drs. Lapey and Khaw are pediatricians and many of their patients are adults, specialists in thoracic surgery, pulmonary care, immunology, and gastroenterology are available at the MGH for immediate consultations, if needed.

Many people wonder how victims of cystic fibrosis cope with the knowledge that with this disease life is short. "These patients do cope," said Dr. Lapey. "It's a tribute to the human spirit that they can." And he added:

"We see real hope for the future . . . very important advances in therapy . . . certainly within the lifetime of our younger patients."

Dr. Khaw declared:

"We always have said that we are in business to put ourselves out of business." ■



Dr. Kon-Taik Khaw looks in on Chester Farmer, a 38-year-old cystic fibrosis patient from Lenox, Mass., who was admitted for treatment of a lung infection and recurrent pancreatitis.

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A Physician Joins the MGH Staff at 80

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the American Board of Pediatrics in 1937 and became a Fellow of the American Academy of Pediatrics in 1942.

For about 15 years until it closed, Dr. Berson served as Chief of Pediatrics at Chelsea Memorial Hospital. He also headed the pediatric service at Whidden Memorial Hospital in nearby Everett until that institution disbanded its obstetrical program.

Other past appointments included Visiting Physician on the Pediatric Service of both the Boston City Hospital and the former Massachusetts Memorial Hospital, now known as University Hospital, in Boston.

At the time of his recent MGH appointment, he was affiliated with Whidden Memorial, Malden Hospital, and, in Boston, with Children's, Beth Israel Hospital, and the Boston Hospital for Women, a part of Brigham and Women's Hospital.

Dr. Berson said the number of hours that he will put in at Revere depends to a large extent on the reaction of his patients to his move. Their records will be on file at the health center, and the patients can still make appointments to see him.

He also said that close, personal follow-ups may still be possible at the center although there will be days when he will not be available. During the doctor's absence, any of his patients who call can be referred to one of three other pediatricians or a pediatric nurse practitioner.

Dr. Sweet said the staff of Revere Health Associates is very appreciative of Dr. Berson's affiliation and will benefit from his expertise and experience.

Only a fraction of Dr. Berson's patients resides in Chelsea. Most come from cities and towns in a 20-mile radius. Some patients cared for by Dr. Berson since childhood, or even birth, and now in their mid 20s still regard him as their physician.

Dr. H. Arthur Berson and a friend

"When I started in medicine, Chelsea was a bustling city of 48,000," the doctor said. "Today, the population is down to about 22,000. Many young people don't stay. They head for other suburbs."

In the past, this has meant house calls which have stretched work days into 16 to 18 hours. When younger physicians phased out house calls as a matter of policy, older practitioners, like Dr. Berson, followed suit, but he said he misses visiting the homes.

"Viewing a home setting and witnessing how family members interacted in that environment," he said, "often proved very helpful in dealing with a patient's psychological problems. We seldom have that advantage any more."

Dr. Berson was described by his eldest son, Dr. Eliot L. Berson, as "a very compassionate physician who wouldn't think of being inaccessible if a patient needed him."

"I learned a lot about patient relations from my father because I often accompanied him on his house calls," the son added. "I would wait in the car, and when Dad came out, he'd describe the experience he had just undergone."

Eliot and his brother, Frank, are both graduates of Yale University and Harvard Medical School.

Eliot directs the Berman–Gund Laboratory at the Massachusetts Eye and Ear Infirmary (M.E.E.I.), which abuts the MGH, and is Professor of Ophthalmology at Harvard Medical School.

Dr. Frank Berson heads the glaucoma service at Beth Israel Hospital and is an Assistant Professor of Ophthalmology at Harvard. He also directs the M.E.E.I.'s Residency Training Program.

Both sons are elated that their father will continue his medical career.

"He enjoys medicine so much," Eliot said. "I think he'll wind up working harder at his new job in Revere than anyone expected." ■

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 3 April 1986

Diagnostic Imaging Expands Its Windows on Health

When Well People Claim Illness

Of the multitude of people who stream into doctors' offices with complaints of illness, between 25 and 40 percent turn out to be healthier than they thought.

But rather than welcome the assurance, many of these patients refuse to accept the findings and insist on a repeat of their medical tests.

Psychiatrists agree that the individuals really believe they are ill. They do feel sick and present a great variety of symptoms such as pain, fatigue, nausea, dizziness, sweating, and poor appetite.

Some of these people say they are so uncomfortable they cannot sleep, they are always late for work, and their social life is wrecked.

Despite the many complaints presented to the physicians, however, they find no evidence from X rays and other medical examinations to explain the symptoms.

Dr. Arthur J. Barsky, who directs the Primary Care Psychiatry Unit in the MGH's Wang Ambulatory Care Center, described one of the most common complaints:

"With some ulcer patients there is little relationship between the extent of the ulcers in their stomach and their subjective reports of pain. In a study we conducted, patients whose ulcers were documented on X ray were treated with a medication and then X-rayed again to see how effective the medicine was in curing them.

"One third of the people whose symptoms were relieved nevertheless continued to have ulcers upon X-ray retesting. At the same time, of patients who reported that their symptoms were persisting, almost one half no longer had any X-ray evidence of ulcers."

Dr. Barsky characterized some of these patients as inordinately sensitive to what is going on in their bodies. They fix upon perceptions, such as a little dizziness upon standing or a patch of dry skin. While others either do not notice or quickly dismiss the conditions, these people suspect the presence of a serious disease.

In studying such patients, Dr. Barsky also examined a random sample of general medical outpatients and realized that people varied tremendously in their reaction to bodily sensations. As his work continued, he isolated at least four sep-

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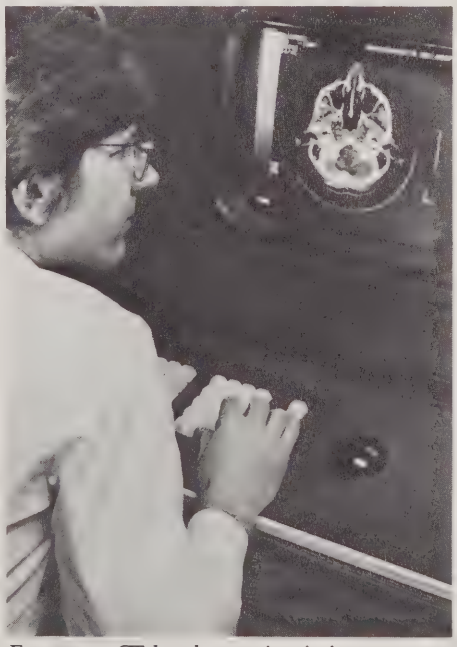

Even as a CT head scanning is in progress, Dr. Gregory Shoukimas of Neuroradiology can focus on specific anatomy to begin evaluating the patient's condition.

In the last few years three powerful diagnostic tools have emerged in medicine. Two, MRI and PET, are so new that a variety of uses are still evolving. As a result, the ultimate ways these instruments will change the practice of medicine remain to unfold. In this article, the MGH News *examines current thinking.* [Editor's Note]

A woman was rushed unconscious to the MGH Trauma Center after being severely injured in an automobile accident. In less than an hour, doctors accurately diagnosed complex fractures of the face, breastbone, ribs, pelvis, and right hip.

Just as important were other findings:

"We were able to determine in the same brief time that, despite the multiple fractures, the woman's brain and the organs in her chest and abdomen had escaped harm," Dr. Robert A. Novelline said. "Surgeons did not have to engage in any further diagnostic testing of the head, chest, and abdomen or in any exploratory operations but were able to concentrate immediately on repairing the broken bones."

A CT (computed tomography) scanner that was added last summer to the armamentarium of the Emergency Ward (E.W.), which includes the Trauma Center, made possible the swift diagnosis. If the scan had detected internal bleeding, possibly due to an organ rupture, doctors would have ordered immediate emergency surgery.

Dr. Novelline, an MGH Radiologist, directs the E.W.'s Emergency Radiology Section, which is manned around the clock. The unit, which offers regular X-ray, fluoroscopy, and ultrasound services in addition to CT, was set up in the E.W. to expedite specialized diagnostic testing.

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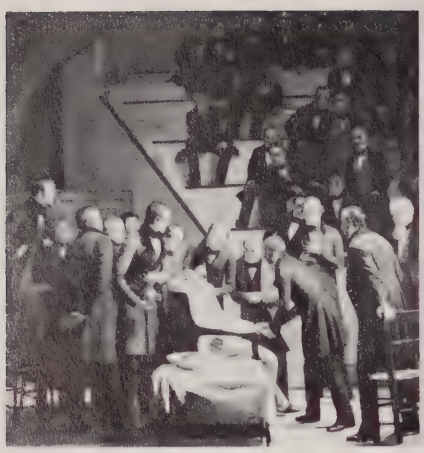

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EDITORIAL:

Patients Who Help Each Other

One of the most helpful additions to the medical scene emanates from something patients can do for each other. That is to demonstrate that the patient is not unique. Probably the best way to show this is through support groups: clusters of people who share their similar experiences. One of the older and best-known examples is Alcoholics Anonymous. Founded many years ago by recovered alcoholics, A.A. helps others by members sharing their own experiences with drinking problems. Through support, encouragement, and example, many have been able to stop drinking.

A.A. has itself spawned affiliated groups to which problem drinkers do not belong. One is Alanon for spouses and others close to the alcoholic. Another is Alateen which helps teen-aged children of someone who drinks to excess. These types of programs aid such relatives to interact with the alcoholic and assist the family members to deal with the guilt and embarrassment that often arise when a loved one is unable to control drinking.

While A.A. serves as a model for organizations started by patients and their families, many such groups receive their impetus from health care providers. At the MGH alone there are several examples of both types. Some involve groups of parents and/or other family members of patients who die. Parents of Newborn Intensive Care Unit patients, for example, were organized by MGH nurses to lend support to the families by sharing their grief about the loss of their extremely ill, tiny premature infants. Another model comes from the Transkidon Club, with a common interest of having had a kidney transplantation procedure at the MGH.

What happens, though, when unlike heart disease, cancer, or alcoholism, someone suffers from a rare problem? There are ailments so rare that few outside medicine have ever heard of them. Porphyria is such a disease. Several types of porphyria exist, but the disease is so unusual that relatively few American physicians ever see a patient with any form. And the diagnosis is so difficult that the disease is often *mis*diagnosed. A Page 6 article describes one patient who had never in the 35 years since a doctor diagnosed her porphyria encountered any one else with the problem. But last month a number of such patients met at the MGH to form a group. The comfort they can provide one another will reflect the experience of the many large organizations formed around a disease.

Claiming Sickness

(Continued from Page 1)

arate factors which seemed to induce certain people to amplify their symptoms.

If we identified those individual factors and modified them, perhaps we could achieve some kind of beneficial effect, he thought. With this idea in mind, Dr. Barsky and two psychiatrist colleagues, Drs. Carol Wool and Edith Geringer, last year launched a series of group treatment sessions open to all who felt they were sicker than the evidence indicated.

Patients attend half a dozen sessions stretching over as many weeks. Each group is comprised of about six people.

The factors that the doctors look for:

Excessive attention to one's body, making symptoms appear worse

People often focus more on their body at times when not much is happening, e.g., a woman awaiting her husband's arrival from work so that she can serve dinner, an office manager with time on his hands before a scheduled appointment, a single man or woman with nothing planned for the weekend.

"It is interesting that in a hospital pain complaints are usually more numerous at night," Dr. Barsky declared. "Tests planned for the day have been carried out. Visitors have come and gone. There's little more for the patient to do, so he focuses on his discomfort. Feeling worse, he calls for more pain medication."

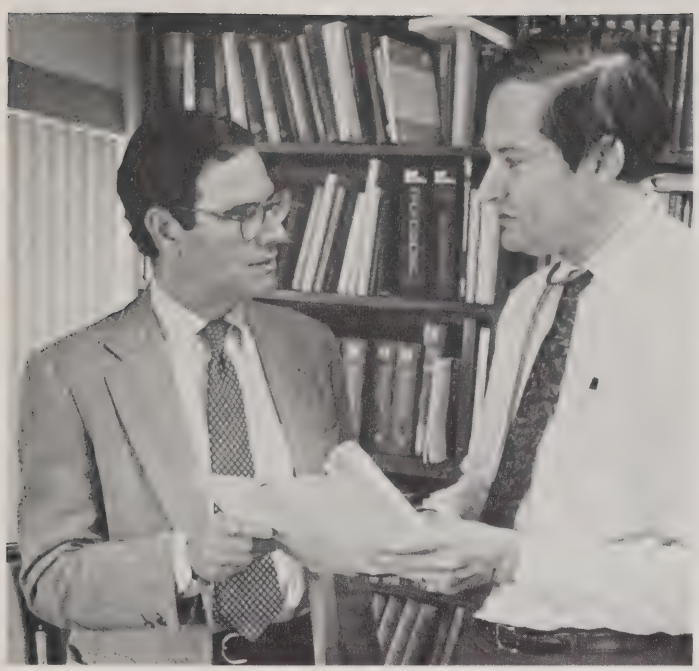
Incorrect belief of what is causing illness symptoms

Everybody picks up little bodily quirks during the course of a day and usually wonders, "Did I eat too much last night?" "Do I need more sleep?" "Is this a sign of advancing years?" The average person shrugs off the incidents. But when one believes that the symptom stems from something serious, then it begins to make a greater impact.

Imagine someone worrying about developing Alzheimer's disease. Thereafter might follow an inability to remember another individual's telephone number. The worried person may very well regard that as evidence that senility is indeed approaching, instead of taking another tack, that the "forgetfulness" was really failure to pay attention when the phone number was first mentioned.

Mood, such as depression or anxiety, which often amplifies physical symptoms

Photographs: Myron Daniels; page 5 (upper), Chris Maynard



Psychiatrist Arthur Barsky, left, and Internist Andrew Billings confer about a patient.

Many individuals appear more sensitive to the physical, rather than emotional, side of psychiatric problems. Ask depressed people how they feel and instead of saying that they often cry, are pessimistic about the future, or feel a sense of guilt about something, they are likely to complain of headaches, pain, constipation, or some other physical symptom.

An acute anxiety attack may at first appear to be a medical catastrophe, like a severe heart attack or stroke. People become very vigilant about their body. They worry about when the next attack will come. They take their own pulse to make sure their heart has not begun to race. They worry about whether their breathing has become too rapid.

Using "sickness" as a solution to a problem

"It's a side door out of a situation," Dr. Barsky said. "It allows you to avoid obligations, like holding a dinner party for someone you don't particularly care for; postponing certain duties, like taking care of the children; or avoiding challenges, like broaching the boss for a raise."

He also declared that people are often inclined to present matters in a physical way. For instance, it is acceptable to call the office and say, "I can't come in today because I feel nauseated." It's not all right to call and say, "I can't come in because my girl friend and I have just stopped seeing each other."

Part of what his team does, Dr. Barsky said, is make people more sensitive to the psychological side of their plight. If that is the crux of the difficulty, then that is what has to be treated.

The first advice that patients in the group sessions receive is to forget the idea that there is a magic drug or a miracle specialist to cure their problem.

"The people who do best are those who learn to live with what they have," said Dr. Barsky, who is also Assistant Professor of Psychiatry at Harvard Medical School.

He told of one patient, a young, hard-driving man, who developed a viral illness. Although it ran its course, the patient thought otherwise. He felt constantly fatigued and was unable to concentrate on his work. He loved to ski and play tennis but could no longer do either. Thinking he had suffered some kind of permanent physical damage, he sought help at three hospitals. No one could find anything wrong.

"We convinced him at the group meetings that even if he had something, since it hadn't killed him yet, it probably wasn't going to," the doctor said. "And we were candid in saying we probably weren't going to find out what was bothering him. We told him that he would do a whole lot better if he tried to minimize his problem. He was able to make that shift and soon stopped seeing himself as an invalid."

Dr. Barsky and his colleagues in Ambulatory Care sometimes work behind the scenes with internists perplexed over how to handle patients who are concerned unnecessarily about their health but balk at being referred to a psychiatrist. Insisting that they are physically ill, they keep returning to the internists for help.

The psychiatrists encourage the internists to walk a fine line, neither dismissing the authenticity of the complaints they hear nor seeing their task as that of finding a cure. Instead, they are urged to convince their patients that if they just try to make the best of their situation, it will improve.

"People who have been invalids for 20 years are not likely to get better," Dr. Barsky said, "but if a problem is caught early on, there is a good chance of reversing things." ■

Psychiatrists Edith Geringer, left, and Carol Wool presiding at a group treatment session

Imaging Methods Complement Each Other

(Continued from Page 1)

Previously, severely injured or acutely ill patients had to be taken from the E.W. to the hospital's main radiology floor. Delays in diagnosis can often adversely affect an individual's tolerance later for surgery.

Today's medical arsenal boasts, in addition to CT, several diagnostic imaging techniques, such as magnetic resonance imaging (MRI) and positron emission tomography (PET).

In 1973, the MGH became only the second medical center in North America to install a CT brain scanner. Three years later, the MGH obtained a new, improved CT device capable of scanning all parts of the body. An MRI (formerly called NMR) brain scanner arrived in 1980 and a whole body instrument in 1984. The MGH was one of the early pioneers in the development of MRI techniques.

The MGH and Washington University in St. Louis pioneered PET scanning processes as far back as 1952. Clinical head studies began at the MGH in 1976, and a new, more sophisticated scanner was installed nearly two years ago.

Rather than being competitive, however, PET complements CT and MRI. While these two modalities look at and reveal "what is there," PET studies physiologic function and relates "what is going on."

Dr. Novelline said that in an emergency room situation CT is the safest, fastest, and most accurate imaging method of detecting and sorting out complicated multiple trauma.

The three-dimensional, X-rayed "slices" of the body produced by CT offer excellent images not only of soft tissue structures, such as organs, but also of complex, curving, bony surfaces, such as those of the face, spine, or pelvis. Thus, CT proves ideal for identifying and evaluating bone fractures in a trauma patient.

MRI cannot visualize outer surface of bone, the so-called cortical bone, but does show bone marrow. With MRI, a specialist can detect a fracture only if it disrupts the marrow as well.

The issue of safety arises because at the outset E.W. personnel are not usually aware of a trauma patient's medical background. CT poses no diagnostic risks beyond radiation, while MRI, through its use of a powerful magnet instead of radiation to stimulate image-making signals, can be harmful under certain circumstances if the medical history is unknown. There are, however, no known long-term effects of MRI.

Suppose a patient were brought into the hospital wearing a pacemaker to regulate the beat of an ailing heart. Because of the magnet, an MRI test could disrupt the pacemaker.

The magnet could also adversely affect a patient who had previously suffered a ballooning of a blood vessel (an aneurysm). Customary treatment of an aneurysm involves putting a metal clip on it. During an MRI test, the magnet might move the clip if it is made of a paramagnetic metal.

In general, use of the magnet precludes MRI testing of any patient on a life support system containing components that can be influenced by the magnet.

Then, there is the matter of movement. MRI cannot be used on a patient who is restless or uncooperative because movement usually blurs the test image.

Despite its shortcomings (especially in E.W. situations), magnetic resonance excels in many other respects.

"In particular, MRI has demonstrated superiority in evaluating the brain stem, spinal cord, and the posterior fossa [an area deep within the brain] for the presence or absence of abnormalities," said Dr. Kenneth R. Davis, MGH Chief of Neuroradiology. "The technique serves as an excellent tool for identifying multiple sclerosis plaques and other disorders in the white matter of the brain."

Dr. Davis said, however, that MRI's superior sensitivity in detecting abnormalities often suffers from lack of specificity. "Availability of MRI contrast agents in the future may provide greater specificity," he said, "but at this time a CT scan and the clinical information are usually necessary to complement MRI findings in order to arrive at a correct diagnosis and appropriate patient management."

CT scanners are superior to MRI for verification of very acute brain hemorrhages but do not provide much information about blood flow whereas MRI researchers at the MGH have developed a novel technique enabling magnetic resonance to produce images of blood flow.

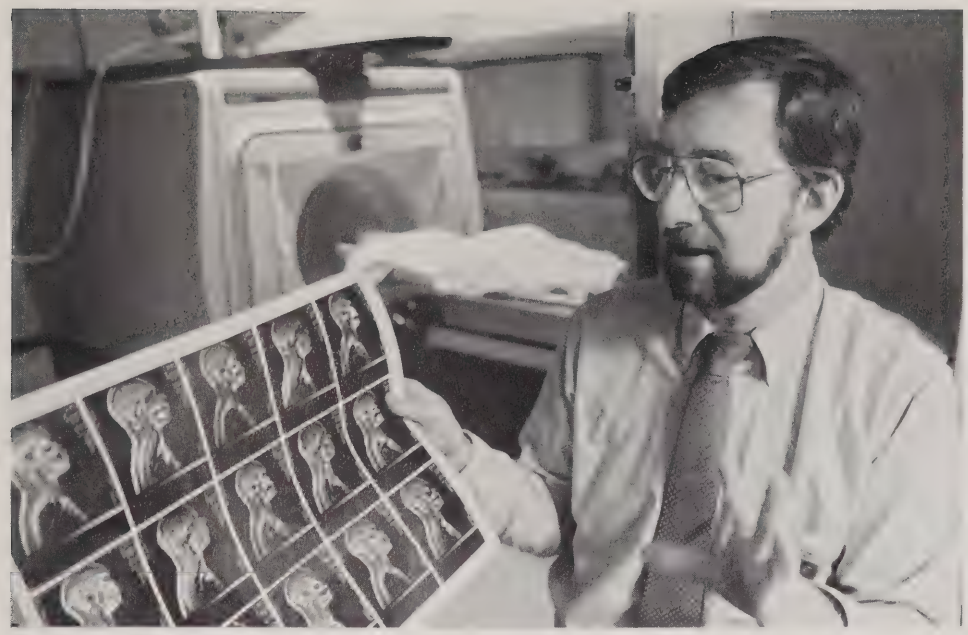
Dr. Thomas J. Brady, director of the magnetic resonance program, said the technique, pioneered by a team headed by Dr. Van J. Wedeen, may one day play a very important role in noninvasive management of blood vessel disease affecting the heart and other vital areas.

The images not only show where vessels are but how fast the material in them is moving as well as the volume of the material. "In the great vessels of the chest, including the aorta," Dr. Wedeen said, "we've been able to increase MRI sensitivity to the presence or absence of a thrombus [clot]."

The technique should be useful in detecting hardening of the arteries and may even permit MRI to substitute for a special X-ray procedure (angiography) that involves injection of contrast material to diagnose blocked arteries and other circulatory disease.

MRI studies soon will focus on blood flow in the carotid arteries and in arteries

In the MGH Emergency Ward, Dr. Robert Novelline and Radiology Technologist Margaret Whittaker ready a patient for a CT scan.



Dr. Thomas Brady discusses a magnetic resonance imaging test.

of the kidney.

Dr. Bruce R. Rosen has been working to develop techniques that would enable magnetic resonance to not only obtain pictures of tissues but also determine their chemistry.

Lactate or lactic acid, for instance, is normally present in low concentrations in the brain but can build up when a stroke or other insult occurs in the blood stream. An MRI ability to detect and keep tabs on lactate could enable a doctor to monitor stroke patients more precisely and better understand the disease process.

Dr. David D. Stark has been evaluating MRI ability to detect liver disorders and tell whether they are benign or malignant. "MRI appears to be superior to other techniques for diagnosing a common benign liver tumor [cavernous hemangioma]," he said.

"Also, when a surgeon sees a patient with lung, breast, or colon cancer and considers removing the tumor, the doctor first wants to know whether the growth has spread to the liver. We can provide that information now with MRI probably better than any other technique. Our method is considered safe and non-invasive."

For certain MRI applications, the use of contrast agents may be desirable. Dr. Randall B. Lauffer has been using so-called paramagnetic contrast agents to modify MR image signal intensities in an effort to improve diagnostic specificity. One agent called gadolinium-DTPA appears to help in differentiating between such matter as a brain tumor and nearby fluid-filled tissue (edema).

As applications for magnetic resonance multiply, computed tomography also moves forward. Dr. Jack Wittenberg, in charge of CT body scanning on the main radiology floor, reported major CT advances in the care of patients with diverticulitis, a disease involving abnormal pockets which sometimes form in the large intestine (colon).

"Many people have these diverticula, or pouches, and are not aware of them," he said. "Sometimes they burst and abscesses develop. The bowels become upset, even obstructive."

In the past, patients faced three hospital visits. First, they underwent an unpleasant barium enema, then spent a month taking antibiotics to fight the abscesses while wearing a colostomy bag for the collection of body waste. A second operation was then scheduled to clear up local problems, and later the patient returned once more for closing of the colostomy.

"Today with CT," Dr. Wittenberg said, "the radiologist can see the abscesses and go on to drain them himself. Within a few days the surgeon does his work, and the patient can go home, the entire treatment entailing only one operation and one hospital stay,"

Dr. Wittenberg said CT has become critical for finding abdominal abscesses which no other technique can locate. Abscesses can occur in many places, e.g., the small intestines, around the liver or spleen, under the diaphragm. Rarely does a week go by, the doctor said, when his team is not called on to drain abscesses in patients who are seriously ill.

As important as it is to know what the inside of the body looks like, it is just as critical to know what is happening. Positron emission tomography—still largely a research tool—is trying to fulfill that second need. At the MGH, PET studies concentrate on diseases of the brain.

PET employs various radioactive tracer chemicals to track the function of brain tissue. The data are then converted into computerized screened images.

PET has already provided information about stroke that can be obtained in no other way. "Because the physiology of the brain changes very rapidly when a stroke occurs, an appropriate treatment at one point might prove inappropriate or even harmful just a few hours later," said

(Concluded on Page 6)

With Drs. John Correia, left, and Nathaniel Alpert, right, assisting, Dr. Robert Ackerman prepares for the start of a PET scanning test. The hose delivers to the patient's brain a radioactive chemical which later permits a three-dimensional image of the tissue under study.

A hand of a 55-year-old gardener afflicted with porphyria cutanea tarda. Periodic withdrawals of a pint of blood over six months provided almost complete relief.

Patients Meet to Discuss a Rare Disease

When Maureen Manuel's father died last year, his death notice invited contributions in his memory to the American Porphyria Foundation.

Shortly after publication of the notice, Mrs. Manuel received a telephone call at her home near Lowell.

"Did your father have porphyria?" inquired a woman in her 50s who had read the notice. "No," Mrs. Manuel answered, "but I have the condition."

The caller, from Wakefield, near Boston, seemed excited. "I was diagnosed 35 years ago as having porphyria," she explained, "and until now I've never known anyone else who had it."

She had never even encountered a physician who knew much about the disease.

Inherited with rare exceptions, it may appear in the bone marrow, where red blood cells form, or in cells of the liver. Depending on which of several types of porphyria an individual suffers, the effects may be severe skin disturbances, such as itching, burning, redness, or blisters, or internal symptoms, including nervous system disorders.

Last month, a small conference room at the MGH was the setting for a series of talks designed to help lift the veil of mystery about porphyria and to outline steps that can minimize or prevent episodes of the illness.

Attended by porphyria patients and others, the two-hour session featured informal lectures by members of the MGH Dermatology Department, and by Drs. Peter V. Tishler of the Brockton/West Roxbury Veterans Administration Medical Center and Micheline M. Mathews-Roth of Harvard Medical School.

Mrs. Manuel, who helped to organize the meeting, described it as the first of a newly formed New England support group of the two-year-old American Porphyria Foundation.

The 35-year-old mother of three said that just knowing that someone else out there is familiar with porphyria makes it a whole lot easier to tolerate the condition.

Mrs. Manuel nearly died from the disease several years ago. Unaware of her predisposition to a form of the malady called variegate porphyria, she entered a hospital to determine why she was getting migraine headaches. Various medications were given to facilitate the examinations and to ease her pain but what followed were seizures, back pains, and abdominal cramps. She said she became gravely ill when her sodium level plunged.

With the help of biochemical tests, a neurologist finally diagnosed the patient's

Diagnostic Imaging

(Concluded from Page 5)

Dr. Robert H. Ackerman, who directs the MGH's Cerebral Blood Flow and Metabolism Laboratory. "By showing us the rapid changes in metabolism, PET allows us to develop a meaningful course of therapy."

Dr. Ackerman added that the increased understanding about blood flow and metabolism in stroke-age people "may allow us to better characterize and treat other neurological disorders of older patients, including Alzheimer's disease and Parkinson's disease. Studies at the MGH and elsewhere indicate that PET also may be useful in Huntington's disease, epilepsy, psychiatric disorders, and brain tumor management."

The higher sensitivity and sharper detail of the new MGH PET scanner allows a more focused look at regional brain physiology than ever before was possible. The studies also can be carried out faster than ever and with less exposure of the patient to radioactivity.

In addition to studying blood flow and oxygen and glucose metabolism, Dr. Ackerman and his colleagues, in particular physicists Richard B. Buxton, Nathaniel M. Alpert, and John A. Correia, all Ph.D.s, have been looking at the acidity of the brain.

"We've developed a very important way to investigate pH changes," Dr. Alpert said. "In acute neurological disorders from stroke through trauma, this work can be very useful in helping us understand what might be hindering improvement in brain function, and what might be tried to make brain function better."

A less costly alternative to some PET scanning processes is in use in some medical centers. Dr. Ackerman said the technique, called SPECT, can look at blood flow but at present cannot routinely examine clinically important metabolic events.

MRI program director Thomas Brady seemed to sum up the feelings of his MGH colleagues when he said:

"We're all in a learning curve. As technologies move forward, they may well cause physicians to alter their referral patterns.

"It seems unlikely, for instance, that MRI will be a first line of choice for evaluating head trauma. But people from other hospitals have said in lectures here that their experience has been they can get more information from MRI than CT with a high degree of specificity. Who is right? Only time will tell.

"Many unknowns are out there and are constantly being discovered. It seems clear that if a modality offers a significant service to the patient, physicians will demand that service." ■

condition and immediately halted her medicines. She thereafter made a complete recovery. The drugs, it turned out, had activated the porphyria. Even though Mrs. Manuel had a history of skin reactions upon exposure to the sun, a frequent clue to the diagnosis of porphyria, no one thought of that disease.

Although a 50–50 chance existed that Mrs. Manuel's children might also have inherited the disorder, the youngsters, now aged 6, 10, and 13, still await tests to define their situation. Mrs. Manuel's mother and a brother have both tested positive for the disease but have never exhibited any symptoms.

Specifically, porphyria is a class of uncommon metabolic diseases marked by an overproduction of red- or purple-colored substances called porphyrins. (In Greek, the word for purple is "porphyrus.")

In the bone marrow, porphyrins help to form hemoglobin which carries oxygen in red blood cells (and makes the cells appear reddish). In the liver, porphyrins figure in the production of other hemoproteins, called cytochromes, which are essential for the transfer of oxygen and energy within cells.

The body tries to excrete excess porphyrins, but when the overproduction is too great they begin accumulating in the liver, blood, skin, and other tissues and become toxic upon receiving certain kinds of stimulation.

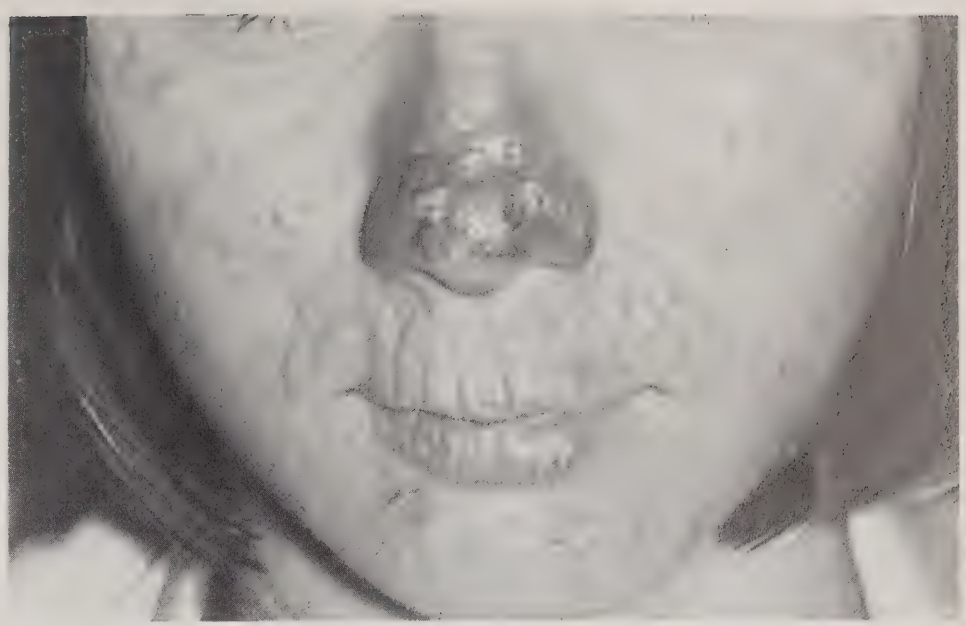
Maureen Manuel's liver-associated disorder is not a well-known entity in the United States, but in South Africa the prevalence is 3 per 1,000 among whites. Almost all of the patients descend from an early Dutch settler who brought the condition to South Africa in 1688.

Dr. Thomas B. Fitzpatrick, Chief of the MGH Dermatology Department, said that variegate porphyria is encountered frequently enough in South Africa that porphyrin screening tests are required for everyone scheduled for surgery there.

"That might be difficult to do in our society since the condition is not as common here," he said, "but if somebody is going to be operated on with Pentothal, a barbiturate, as the anesthetic, then the patient should really be screened for porphyria by history, if not by lab test."

Porphyria's complexity makes it difficult to diagnose. The typical skin lesions of the potentially fatal variegate form cannot be distinguished from those of another type of porphyria called cutanea tarda, which is readily treatable.

The removal of a pint of blood from the patient once or twice a month and total abstinence from alcohol constitute the standard treatment for cutanea tarda.



A 15-year-old girl with erythropoietic protoporphyria, which caused severe sensitivity to sunlight. Taking beta-carotene pills usually helps.

Dr. Fitzpatrick told of a California man who came to his office with severe hand lesions. The patient, about 70, said he was under the care of a dermatologist back home for vesicular eczema. Dr. Fitzpatrick looked, stepped away for a minute, and returned with a book. Opening to a page that showed a color photo of a hand afflicted with porphyria cutanea tarda, he said, "You don't have eczema. You've got this condition."

Questioning revealed that the patient also had cancer of the prostate and was taking estrogen for it. The estrogen was causing the porphyria. Without discontinuing that drug, the patient began a series of bloodletting treatments and his hands cleared up.

No one is quite sure why periodically giving up some blood benefits the cutanea tarda patient . . . and why the treatment does nothing for people with other types of the disease. Unlike other porphyrias, however, cutanea tarda is not always genetic in origin.

The most common form of porphyria in the United States is believed to be acute, intermittent porphyria, although it apparently strikes only 1.5 people in every 100,000. Much like variegate, the disease, originating in the liver, also can be set off by some sedative-type drug, as well as by consumption of alcohol, and prove fatal. Patients with acute, intermittent porphyria may escape skin problems, but they do have neurological lesions.

The overproduction of porphyrins in the bone marrow leads to one of two forms of porphyria: erythropoietic porphyria and erythropoietic protoporphyria.

The first, also known as Günther's disease, is exceedingly rare; fewer than 150 patients have been reported in the world. Inherited when both parents carry the gene, the disease becomes evident in infancy. Even minimal exposure to sunlight can cause painful and disabling skin lesions. No treatment to block the disease is known.

Protoporphyria, inherited from either parent, can be diagnosed usually between ages 1 and 5 when, after exposure to the sun, the child's skin begins to itch, burn, and grow puffy. Discovery of this disorder in 1960 led to research, however, which produced an effective treatment (*MGH News,* December 1970).

Human studies, which began at Boston City Hospital and the MGH, focused on beta-carotene, found in many foods such as carrots and tomatoes.

The work showed that beta-carotene not only shielded many plants and bacteria from heavy doses of light but could also lower sensitivity to light in protoporphyria patients. The substance, taken orally, has not been helpful against other forms of light-sensitive disorders.

"This points up why the organization of a support group for the American Porphyria Foundation is so welcome," said Dr. Fitzpatrick, who is also Wigglesworth Professor of Dermatology and Chairman of the Department at Harvard Medical School. "There is so much to be learned about the various types of porphyria, including how common they really are." ■

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A Simple Cord Keeps a Little Boy Alive

What is it like to live on a shoestring?

Although not yet two years old, Jorge Osario of Chelsea, Mass., knows.

Jorge is a happy, smiling, playful child, but for him a surgical cord that closely resembles a shoestring spells the difference between life and death.

Jorge was born in a mountain village in Colombia, far from any major medical center. Local physicians recognized right away that he had a heart problem, but not until his family emigrated to the Boston area many months later did anyone realize that he was suffering from one of the rarest forms of congenital heart disease.

His heart contains three chambers instead of the usual four. The left and right atria, which serve as reservoirs, are normal, but instead of two ventricles, or pumping chambers, Jorge has one big ventricle. The wall (septum) that normally separates the ventricles never developed.

A normal heart pumps blood from the right ventricle through a pulmonary artery to the lungs to pick up oxygen. Now carrying the life-giving oxygen, the blood returns to the heart, flowing into the left ventricle, and enters the main artery, called the aorta, to recirculate through the body.

In Jorge's case, the blood received new oxygen but, on flowing into what would normally have been the left ventricle, wound up back where it started and mixed with blood that had not yet been oxygenated.

Dr. Richard R. Liberthson, an MGH pediatric and adult cardiologist, said the result was that blood going out through the aorta contained much less than the optimal supply of oxygen. More important, much of the oxygenated blood in the heart simply recycled through the pulmonary artery and the lungs.

Jorge Osario in the arms of his mother

This constant and almost torrential reflow enlarges the heart and brings on congestive heart failure. The young victim becomes susceptible to a number of serious infections, such as pneumonia, and his lung arteries thicken from atherosclerotic-like changes.

Dr. Marco Dannon, a pediatrician at the MGH's Chelsea Memorial Health Care Center, came upon Jorge's serious heart problem during a clinic examination and referred him to Dr. Liberthson.

"He was a small baby," Dr. Liberthson said. "At 18 months of age, he was about half normal size. He was blue from lack of oxygen and unable to do anything without breathing very hard. Just the act of eating took much of his energy."

At the MGH, Dr. Liberthson obtained an electrocardiogram, a recording of the heart's electrical activity, and Dr. Mary Etta King performed echocardiography which provided a detailed screened image of the heart's anatomy and showed how the organ was functioning. Dr. Igor Palacios studied the heart's arteries by means of a cardiac catheterization.

Dr. Liberthson said the tests indicated that if Jorge did not undergo surgery within the next six or eight months, his heart probably would be inoperable. Without an operation he faced almost certain death.

The physicians met with Dr. Marshall L. Jacobs, an MGH cardiac surgeon who is also surgical director of the hospital's cardiac transplantation program, to discuss what steps could be taken to save the little boy.

His age precluded any attempt to fashion a septum to divide the single ventricle. In such a small child, that surgery carries a 50 percent risk of death.

Instead, the medical group elected to have Dr. Jacobs do a "pulmonary artery banding." By creating a narrowing in the artery, he reduced the flow of blood through the vessel, thus easing pressure upon the lungs and also enabling more blood to go out of the heart to the body after receiving oxygen. The vicious circular flow of blood within the heart and through the lungs, which cost so much in energy, was ended.

"We got to Jorge in time," Dr. Liberthson said. "His lungs had not been irreparably damaged." After his operation, the child went home within a week. He no longer had to take heart medicines. He could eat and play and laugh.

The band around the pulmonary artery will remain in place for at least several years as Jorge grows. Then, at an appropriate time, he will undergo surgery to have an artificial wall inserted in his ventricle to create separate chambers. The prosthesis should help him live a full life. ■

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 4 May 1986

Laser Unit Opens to Eradicate Unsightly Blemishes

MGH Appoints Noted Scientist to Oversee Biomedical Engineers

The days when physicians had only their own senses to work with in diagnosing illness or injury are long gone.

Today, doctors routinely combine their skills with those of biomedical engineers—people who design, build, and service instruments which not only permit a more penetrating look at frailties of the human body but also often assist in their treatment.

Now this unique blend of knowledge has been strengthened at the MGH with the appointment of a ranking professor and scientist at Massachusetts Institute of Technology as Chief of the hospital's Department of Biomedical Engineering.

The arrival of Ernest G. Cravalho, Ph.D., coincided with his appointment as the first Edward Hood Taplin Professor of Medical Engineering in the Harvard–M.I.T. Division of Health Sciences and Technology (H.S.T.).

The professorship honors the memory of a brother of New England industrialist John Taplin. It was established by him and other family members. John Taplin also created a foundation which supports research under way in the MGH Biomedical Engineering Department.

Although many MGH staff members teach in the Harvard–M.I.T. Division, the high level of Dr. Cravalho's dual appointment establishes the first full academic link between the MGH and M.I.T. It also represents another step in a long-term reorganization of the hospital's Biomedical Engineering Department which began in January 1982.

(Continued on Page 3)

A laser treatment developed at the MGH is being used to cure patients of certain skin problems that can have profound psychological effects.

Most prominent are birthmarks known as port-wine stains (hemangiomas) which are abnormal formations of blood vessels in skin (*MGH News,* March 1980). The affliction besets an estimated 55,000 Americans.

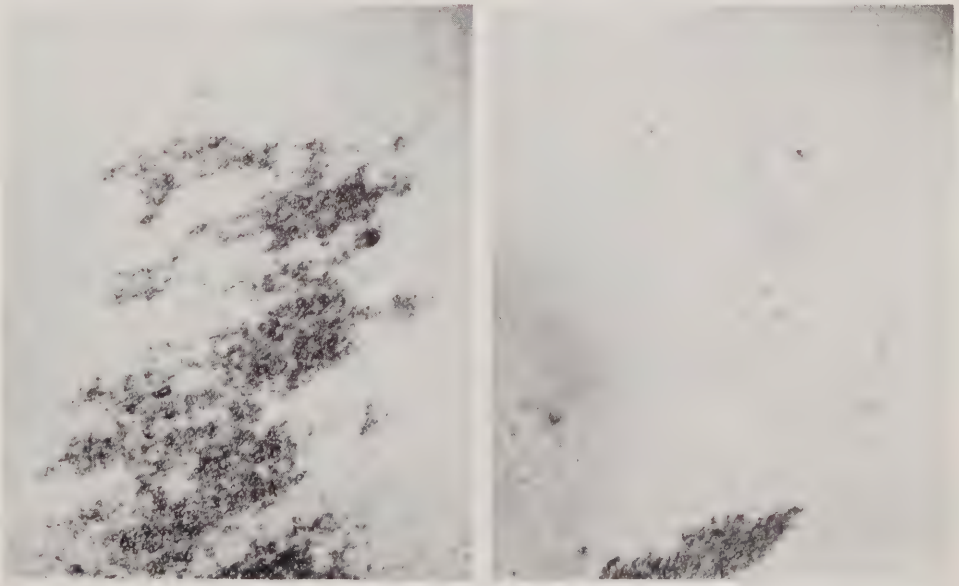
Covering areas of skin ranging in size from smaller than a dime to half the body, the purplish marks often persist for life and darken. In the past, they responded only to a surgeon's scalpel, always with some resultant scarring, but more recently they have also yielded to the power of a laser.

"We are offering a new dimension in skin care," said Dr. Ernesto Gonzalez as he announced the opening of a laser unit in the MGH's Dermatology Ambulatory Center, which he heads.

Although during the last few years some medical centers have treated port-wine stains with an argon laser, the MGH has turned to another device available for patient care under a trial permit granted by the federal Food and Drug Administration.

The instrument, called a tunable dye laser, has undergone several years of study in the MGH's Wellman Research Laboratories, directed by Dr. John A. Parrish.

During 18 months of patient care trials in the Wellman Laboratories and by a medical collaborator, Dr. Jerome Garden, of Northwestern University in Chicago, the investigators used the device to treat both port-wine stains and a condition known as telangiectasia in which dilated blood vessels just under the skin create an appearance of ugly red streaks, often on the face. *(Continued on Page 2)*



In left photo, a port-wine stain on the side of a patient's neck. At right, the area after only one laser treatment. The lower portion of the birthmark, situated below the neckline, was not treated.

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EDITORIAL:

Unencumbered, Unconcerned?

Are mood changes which accompany menopause psychological? How about painful menstruation? Is it psychological?

Until comparatively recently women complaining of various menopausal-related pain, discomfort, and the like received little sympathy from many physicians. A number of doctors regarded these problems as "all in the mind." Now many of these complaints are widely recognized as phenomena with very real physiological bases. Hormonal changes, of course, often play a key role.

Why this delayed recognition? As a Page 7 article states, 19th century women often died before experiencing menopause. Therefore the concomitant problems were less well known. Then too, regardless of the longevity of women, the males who have traditionally dominated medicine are only relatively recently finding that even they may be subject to a kind of menopause.

From Cells To Cure

In 1983, *Science* magazine published an article describing in highly technical language some studies carried out with a laser. Not just any laser but a tunable dye laser. The study showed that it was possible to aim the device with such precision that a researcher could obliterate a single living cell without harming an adjacent one. This basic or fundamental bit of science seemed to some a long way from practical application.

Now only three years later the MGH is opening a unit to employ this instrument for patient care. A Page 1 article reports on the new unit aimed at removing several types of disfiguring facial marks. The alacrity with which the MGH study moved from basic research to patient care trials to everyday treatment at this hospital is somewhat remarkable. And once again the sequence demonstrates the preeminence of basic research as a cauldron in which to mix the brew that can lead to many practical or applied advances in medicine.

Dye Laser's Beam Leaves No Scars

(Continued from Page 1)

All of the more than 100 patients treated showed improvement. Patients as well as observers rated the results as good to excellent.

Dr. Parrish's team trained Dr. Garden in the use of the tunable dye laser and also provided him with the device with which he treated his patients.

A colleague of Drs. Gonzalez and R. William Gange in the new laser unit, Dr. R. Rox Anderson, initiated research with the dye laser several years ago. He described it as superior to the argon in several ways. Unlike the argon which he said requires use of a local anesthetic and may leave some scarring, the dye laser needs no painkilling agent, and "of the patients treated thus far with the MGH procedure, we've seen no scarring at all."

These important advantages, said Dr. Anderson, who is also Director of Applied Laser Research in the Wellman Laboratories, is due to the dye laser's unique ability to be selective. The laboratories first described that characteristic in a pioneering paper in *Science* magazine.

Through the use of prisms and specific fluorescent dyes, physicians can make the instrument "tune in" and affect or destroy predetermined targets in skin without harming surrounding structures.

In contrast, the amount of radiation needed by other lasers to affect a blood vessel is enough to change nearby structures, such as sweat glands, hair follicles, the epidermis or outer skin layer, and the material (collagen) which provides the framework for tissues.

The dye laser is set to a wavelength of light that is absorbed selectively by the hemoglobin of blood within a vessel. The light beam shines on each target for only about 400 millionths of a second; a very short "pulse." Although the temperature in a blood vessel exceeds 100 degrees, the heat turns off before it can diffuse from the vessel.

The purple color of the port-wine stain usually relates to the amount of oxygen in the blood at the site. Although the naked eye sees purple, the laser's wavelength is well absorbed by both oxygenated and nonoxygenated blood.

Photographs: Page 1, courtesy of Dr. R. Rox Anderson; p. 3, Chris Maynard; pp. 4, 5, 6 (upper), 7, 8, Myron Daniels; p. 6 (lower), courtesy of Dr. Robert Young

Dr. Gonzalez said that if a port-wine stain covered the entire back of a man's hand, the area could be treated with the dye laser in just 20 minutes. Several weeks must elapse before the patient is seen again to determine if the blood vessels have completely shrunk. Three or four treatments may be needed in all.

Changes in the skin may vary. Sometimes the redness can be so reduced that the skin now appears normal. In other patients, the redness may fade, but not completely.

"We can usually tell within a few months whether the response to treatment will be good or not," Dr. Anderson said. "We don't expect, however, that the patient's final appearance will be stable until about a year after the first visit."

Dr. Gonzalez said that the argon and dye lasers can be equally effective in erasing abnormal skin coloring but areas on the face where the skin folds must be avoided with the argon because those regions tend to generate more scar formation. No such restrictions apply to the dye laser.

Both pediatric patients, who tend to scar easily, and adults can be treated with the dye laser.

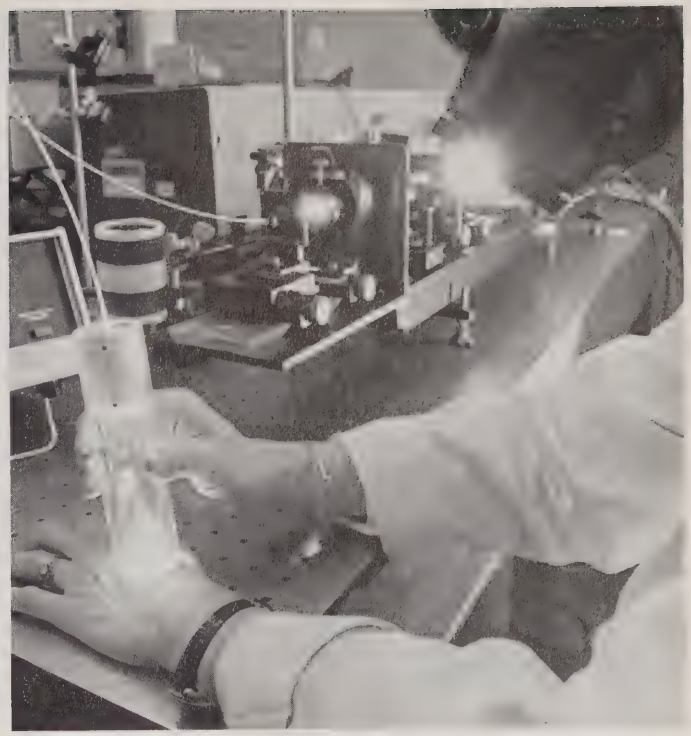
In general, the unit will only treat customarily exposed areas of the skin. Exceptions would include people, such as dancers, whose lesions appear on a thigh or other uncovered parts of the body.

In contrast to the extensive vascularity of port-wine stains, with vessels overlapping, telangiectasia may involve only one blood vessel. The dye laser often can deal with this in a single visit by the patient.

This condition can also be treated through destruction of the tissue with an electric current (fulguration). But the procedure, using a needle, is painful and leaves scars.

The laser unit is also equipped with a carbon dioxide (CO_2) laser, much used in medicine. Most lesions amenable to fulguration are treatable with the CO_2 with less discomfort and scarring. The MGH machine, however, is being devoted primarily to disposal of warts of various kinds. Eventually it may also be used to eliminate elevated brown lesions (seborrheic keratoses) which most people develop as they get older.

Dr. Gonzalez said that initially the laser unit will operate only Monday mornings and Wednesday afternoons. The cost of treatment with the dye laser is comparable to that of the argon, when used for the same purpose. CO_2 laser treatment is similar in cost to that of the fulguration procedure.



A pulsed tunable dye laser in operation with the light directed through a fiberoptic system

The potential applications for the tunable dye laser may one day lead to an expansion of the laser treatment hours in Dr. Gonzalez' dermatologic unit in the Wang Ambulatory Care Center.

"I think we're only seeing the tip of the iceberg," he said.

"For instance, many patients with leg ulcers are seen at the MGH. Their treatment may require periodic hospitalization over many months. The ulcers first have to be cleaned surgically, getting rid of the necrotic [dead] tissue that develops at the base of the ulcers. And that can be very painful.

"Someday, using the tunable dye laser, we may be able to selectively dispose of the necrotic tissue so that the ulcerous areas can heal. The laser treatment would be performed on an outpatient basis and with a minimum of discomfort."

Dr. Anderson also envisions using the laser to treat benign pigmented lesions of the skin. Its wavelength could be adjusted to the absorption spectrum for melanin, a major pigment in the lesions.

"Treating skin cancer is another story," he said. "This effort involves other equipment. The treatment is very different, and so are the goals.

"The main laser applications in our ambulatory care unit will involve red and brown lesions, and that alone is a lot of dermatology." ■

Biomedical Engineers

(Continued from Page 1)

Ronald S. Newbower, Ph.D., and Jeffrey B. Cooper, Ph.D., its Director and Associate Director, respectively, were key planners in the reorganizing effort. They will continue their management roles in the department's operations as well as expand their research and teaching activities as faculty members in H.S.T. and at Harvard Medical School.

As head of the department numbering some 45 specialists, including researchers, engineers, designers, technicians, and Clinical Fellows, Dr. Cravalho will share equal status with other MGH service chiefs and also serve as a member of the institution's medical policy-making General Executive Committee.

In Cambridge, he will continue to teach in H.S.T. and in M.I.T.'s Department of Mechanical Engineering. He will also continue to serve as Associate Director for Biomedical Engineering in H.S.T. and to advise students in a doctoral program he helped to create there in 1977.

When the MGH department was originally established in the late 1960s, it was essentially a service unit, concentrating on the management and maintenance of instrumentation used in critical care. As other groups affiliated with the unit in

(Continued on Page 4)

Dr. Ernest Cravalho, left, and Associate Design Engineer Robert Lagasse discuss planned improvements for an isolette, including radiant warming and a respiratory humidifier.

Biomedical Engineers Expand Their Role

(Continued from Page 3)

1982, in particular Dr. Newbower's bioengineering team from the Department of Anesthesia, the Biomedical Engineering Department began to take on an academic and research flavor in preparation for this latest step toward full parity with the other major MGH services.

A prime purpose of the department's reorganization over the last four years was to develop the philosophy that to make the greatest contributions to patient care, biomedical engineers had to immerse themselves in the clinical life of the hospital.

Today, they not only service patient care equipment of all types throughout the hospital but they also conduct a wide array of research projects such as studies of blood pressure waveforms and pediatric pulmonary function.

The interests of the department's medical device designers have also covered a broad spectrum, from programming an inexpensive computer to help paraplegic patients improve communication with their physicians to constructing an isolette with many new features for transporting critically ill infants to the MGH from other hospitals.

The designers also played key roles in development of the isolation facilities of the MGH's new burn treatment unit.

A number of the department's members hold doctorates from H.S.T. Others with master's degrees from Boston University, Tufts, and M.I.T. did much of their academic work at MGH.

The holder of B.S., M.S., and Ph.D. degrees in mechanical engineering from the University of California at Berkeley, Dr. Cravalho has served on the M.I.T. faculty for the past 20 years. A member of the Institute of Medicine in the National Academy of Sciences, he serves on the scientific advisory boards of several foundations and corporations. He has authored or coauthored numerous books and papers on the application of the engineering sciences to problems in medicine.

Early in his career Dr. Cravalho gained wide attention with research on the application of low temperatures to biological materials for purposes of long-term preservation. The work conducted in his laboratory identified and quantified events related to cryopreservation that had been pure speculation in the past.

Some of Dr. Cravalho's studies were conducted at the MGH in collaboration with Dr. Charles E. Huggins, Director of the hospital's Blood Bank and Transfusion Service, who some years earlier had pioneered a practical way to freeze and thaw blood.

Dr. Cravalho directed development of the first fully programmable cryomicroscope, since replicated in laboratories worldwide. Most recently, his interest in the field has focused on the cryopreservation and transplantation of mammalian embryos and ova.

Another project that involves cold temperatures comes under the heading of cardiology. When abnormal electrical activity in the heart triggers irregular heartbeats (arrhythmias) and drugs fail to remedy the situation, surgeons usually must open the chest and use a freezing technique to destroy the cells that are producing the electrical interference. Dr. Cravalho has begun studies aimed at effecting the same cure without having to open the chest.

"The idea," he said, "is to extend a catheter [tube] to the heart through the femoral artery [in the thigh] and then deliver a refrigerant solution to the heart through that tube."

Once the cooling process finds the problem cells, as evidenced by a return of normal sinus rhythm, the cells can be eliminated permanently through freezing.

Dr. Cravalho is also involved in other important studies, such as urinary tract problems that often develop as part of the aging process.

"One difficulty is that the tube through which urine flows is elastic," he said, "and these elastic properties become stiffer with age. That may contribute to problems of incontinence.

"We've been trying to develop new instrumentation that would enable us to better diagnose this and other urinary disorders and plan a more effective way of managing such patients."

In the course of studying how urine flows through that elastic tube, or urethra, Dr. Cravalho began looking at the driving force for the fluid, namely the bladder.

In addition to being a container for urine, the bladder is also a pump. Contraction of its muscled lining provides energy to expel the fluid. Certain bladder disorders, however, may interfere with this pumping action.

"This has led us to begin work on an artificial bladder," Dr. Cravalho said. "It would be implanted in the body as a substitute for the crippled one. A catheter would extend from the prosthesis to a surgically created body opening [stoma]. On feeling a need to urinate, the patient would only have to open the external end of the catheter."

With strengthening of the partnership between the MGH and M.I.T., Dr. Cravalho sees valuable benefits to both. "The hospital setting can provide important new educational opportunities for M.I.T. students," he said, "and if technological problems develop at the MGH, I have colleagues I can consult with on the Cambridge side."

Studies of Tremors Provide Important Diagnostic Clues

Holding a stopwatch, the neurologist instructed his patient:

"Unbutton your jacket as fast as you can and then button it again."

The patient complied, his fingers slowed by the tremors of Parkinson's disease. The doctor recorded the elapsed time.

"Now let's see how fast you can walk 20 yards along the corridor outside my office," he said. Again he tallied the seconds with his stopwatch.

When a medication produces dramatic improvement in a neurological patient, its effect may become quite evident through a display of renewed capabilities.

But what if the demonstrated progress is only moderate or even slight? How does the doctor document the patient's latest status in order to decide whether to prescribe more of the old medicine or to try something different? Perhaps the physical therapy or occupational therapy program outlined for the patient needs to be altered.

"We have a tremendously difficult time in this field called neurological rehabilitation," said Dr. Robert R. Young, Chief of the MGH's Clinical Neurophysiology Laboratory. "We often have to make predominantly subjective evaluations of how a patient is doing, and that is not good enough."

In the Neurophysiology Research Laboratory, Margaret Wierzbicka, Ph.D., demonstrates a test for tremors in a muscle that controls her left wrist.

A professional athlete who loses even one percent of his coordination due to a muscular problem will find his career as a performer short-lived.

Concert musicians also must be able to exhibit 100 percent of their motor capabilities.

And what can be done for patients who as a result of strokes, head trauma, or spinal cord injuries are partially paralyzed and can no longer write or walk very well.

The outlook is finally becoming brighter. "We're now beginning to know better where we stand," Dr. Young said. "For the first time, we have a fundamental way of measuring objectively whether a patient's treatment is really helping or not."

For the past ten years or so, Dr. Young and an MGH colleague, Dr. Bhagwan T.

(Continued on Page 6)

For the last dozen years, Dr. Cravalho has directed a summer program at M.I.T. designed to interest minority high schoolers in engineering careers. From about 1,200 high schools across the nation, 45 to 50 students between their junior and senior years are invited to the Institute for an intensive six-week session with all expenses paid. The students learn how engineers think and manage to translate ideas into something physical that can serve a perceived need in society.

As he continues this program, Dr. Cravalho plans to inaugurate a second curriculum this summer, this one aimed at attracting minority high school students into various health professions.

With his interests so numerous, varied, and time-consuming, Dr. Cravalho was asked jokingly what he does with his spare time. He had a ready answer:

"I enjoy woodworking, making cabinets and other furniture. In just a short while, I can stand back with a sense of accomplishment. I very quickly have something to show for my efforts." ■

Dr. Cravalho and Biomedical Equipment Technician Diana Strother with an intra-aortic balloon pump, developed jointly by MGH and the Avco-Everett Research Laboratory, to help stabilize heart patients

Tiny Muscle Units Offer Key to Tremors

(Continued from Page 5)

Shahani, have studied the mechanisms believed involved in muscle tremors and spasms.

In the last two or three years, with the aid of two research associates, Allen W. Wiegner and M. Margaret Wierzbicka, both Ph.D.s, the computer-based studies have concentrated on what are termed "single motor units."

Dr. Robert Young monitors a recording of single motor unit activity in a muscle.

The human body contains several hundred muscles. In turn, each of those has several hundred motor units.

Dr. Young said that his team has been studying the smallest thing that the nervous system can do as far as the outside world is concerned: the firing not only of a single motor unit but, more specifically, the first unit to become activated in a particular muscle when a person makes the smallest possible movement.

"By learning about the firing properties of motor units," Dr. Young declared, "we hope to gain some kind of a handle on factors like coordination, finesse, speed, and power."

He described tremors and spastic paresis (spasticity plus the weaknesses that accompany it) as extremely common conditions among neurological patients. Tremors were studied first because an estimate of their size and speed in a patient can be made by a tremor polygraph test. Thus, it can assist investigators in checking the accuracy of findings regarding motor-unit activity. Polygraph tests are unable to evaluate muscle spasms.

Single motor-unit research has enabled MGH neurologists to make a much clearer distinction between Parkinson's disease tremors and nervous tremors which can run in families.

Effective treatment depends on an accurate diagnosis. The Parkinson's patient who suffers an increase in tremors before delivering a public address needs a so-called beta-blocking drug such as propranolol to curb the increase in tremor due to anxiety. More of the Parkinson's medication would only make the patient feel worse.

The MGH tremor research has focused primarily on muscles in the forearms and hands, particularly extensor muscles controlling the wrists.

"We have to be absolutely sure that we record the firings of the same motor unit, and that another unit does not get in the way," he said. "We have often had to discard data because of such contamination."

The investigators feed acceptable data on single units into a computer for statistical analyses of how the units fired. By evaluating the behavior of a few motor units, the researchers can make a quantitative assessment of the motor system.

A unit may fire up to 15 times a second, but the firings will be spaced at slightly irregular intervals within that second.

Dr. Young said that the net result is a very small tremor which is hidden below the apparent smoothness of ordinary movements. "You can see this normal or 'physiological' tremor," he said, "by extending your arm and closely observing the tiny movements of your fingertips."

When an individual is nervous or frightened, however, many motor units stop firing randomly and become synchronized. "When they fire all at once, maybe five times a second, you get a clear tremor five times a second," Dr. Young declared.

Thus, the study of single motor units delineates patterns of behavior in both normal and abnormal muscles. With that information, one can tell during periodic checkups whether a patient under treatment for tremors has improved and, if so, to what degree.

One can induce a tremor in a person simply by administering adrenalin. The result is reduced independence of motor units and increased synchrony of their discharges.

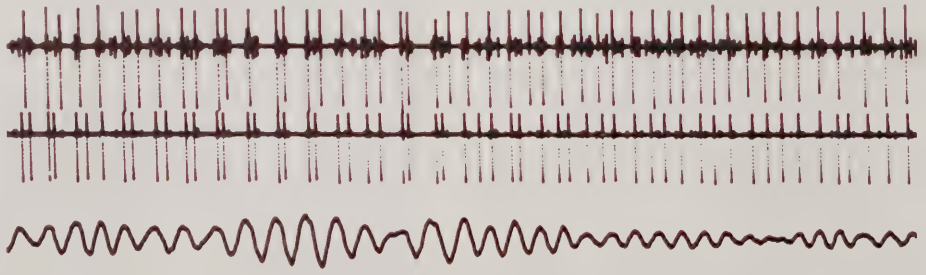
In the past, it was thought that adrenalin and related compounds worked on the brain to cause this. It is now known that to produce the most common kinds of tremors, such drugs act directly on the muscle through peripheral mechanisms that can be controlled by the physician; therefore, the way is open to try to learn exactly what causes muscles to tremble instead of contracting smoothly.

What happens during spasticity is difficult to measure because, unlike tremors which represent too much movement, spastic weakness is characterized by too little of something, e.g., too little strength, too little quickness, too little coordination. As Dr. Young's team increases its knowledge about tremors, it may gain important new insights about the spastic patient.

In addition to identifying heretofore unknown patterns of muscular behavior in tremor patients, MGH investigators now recognize the existence of mechanisms or circuits in the spinal cord which can manipulate motor unit activity to cause tremors.

If such mechanisms could be controlled, then tremors—and possibly spasticity as well—might one day be eliminated.

This is where animal research comes in. In the past, one could not study tremors in an animal because the experiment required it to be anesthetized, and that caused all tremors to stop. But now the laboratory researchers have something else to look for in the animal, the



This recording shows a hand tremor subsiding. Each of the top two rows represents the action of a single motor unit in the same muscle. Some of the firings (the vertical lines) at left are abnormally close together. The wavy line at the bottom is a recording of the hand movement during the tremor.

Using a special microscope, Chromosome Laboratory Technologist Nancy McAllister photographs chromosomes in a blood specimen to check for an abnormality which may be associated with premature menopause.

Trying to Solve the Puzzles of Menopause

The winding down of a woman's childbearing years ushers in one of the least understood times in her life.

How she reacts to menopause, or "change of life," may be a major factor in determining the quality of her future years.

Almost all hip fractures in women, for instance, occur after menopause. Investigators are trying to learn whether adequate estrogen replacement therapy can prevent loss of bone density which accompanies menopause and which sometimes progresses to the bone-degenerating disease, osteoporosis.

In the entire history of woman, the vast majority of reports on experiences with menopause has been amassed only within the last few generations.

Menopause begins at about the age of 50, and prior to the turn of the century many women never experienced this change. Around 1900 the life expectancy of the average woman in America was under 50 years.

Since then, female longevity has soared, propelled by rapid strides in medicine. Today, the average life span of a woman in this country is 78.2 years.

Many factors accounted for the tremendous advances, such as the advent of penicillin which helped to block infections at delivery (puerperal sepsis) and realization of the importance of vitamin D to growth and development. Vitamin D deficiency in a girl sometimes resulted in pelvic malformations which later complicated births.

As women survived longer—in an era which became known as "the graying of America"—many people became convinced that issues associated with menopause were predominantly psychological.

Such convictions continue to enjoy wide support, but "as we've studied menopause more and more closely," said Dr. William F. Crowley, Jr., of the MGH's Vincent Memorial Hospital, "it has become clear that the vast majority of menopausal symptoms do have a physiologic basis."

Dr. Crowley, Chief of the Vincent's Reproductive Endocrine Unit, cited a couple of examples:

"Take mood changes which accompany menopause. For years, they were thought to be related to issues such as loss of fertility or the so-called empty nest syndrome [when the children have grown and moved away to be independent].

"More recently, people have noticed that one of the things affecting women's moods during menopause is that they do not sleep as well or as soundly as before. It takes them longer to get to sleep, and they awaken more frequently, often with either hot flashes or night sweats.

"When the women are given estrogen, the female sex hormone, the sleep latency—the time from when their head hits the pillow to when they are really asleep—is shortened. They sleep sounder, and their mood is improved. So what was thought to be psychological has turned out to be real.

"Take dysmenorrhea [painful menstruation]. This was always considered to be psychological until investigators discovered that inhibitors of prostaglandins [hormone-like, regulating substances] could sharply reduce these 'psychological' complaints. The researchers found that an abnormality of prostaglandin metabolism in the endometrium was causing the dysmenorrhea, or cramps."

Dr. Crowley estimated that during menopause 60 to 80 percent of women experience the sudden sensations of warmth known as "hot flashes."

Although they occur during the female body's loss of estrogen, no one knows what actually triggers them.

In the Vincent's Reproductive Endocrine Clinic, Dr. Nanette Santoro, a gynecologist, frequently sees young women, in their 20s and 30s, who complain of these symptoms.

"They can articulate exactly how they feel," Dr. Santoro said, "but when you inform the patients that they are going through premature menopause and are infertile, they are taken aback.

"Their ovaries don't function properly because their bodies are very low in estrogen. They wind up amenorrheic [not menstruating] and endure repeated hot flashes. They need estrogen supplements."

To decrease their chances of developing endometrial cancer [involving the lining of the uterus], patients on estrogen replacement therapy also take progesterone, another female hormone. Progesterone counterbalances the action of estrogen in the uterus.

Dr. Santoro believes that the dread many women feel for the menopausal period—which may occur normally as

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spinal circuits responsible for synchronizing motor-unit discharges, for example. Once found, they can be stimulated with electrodes, and tested in various ways which might lead to new treatments.

Dr. Young, who is also Professor of Neurology at Harvard Medical School, said the science of rehabilitation has simply not kept pace with other aspects of medicine.

"What can you do when a person has damaged his spinal cord?" he asked. "Well, although you may not be able to restore the patient's ability to walk normally, you can usually improve performance to some degree. But it has been difficult because planning treatment has come down to 'whose therapy do you think works.'

"Now, at the very least, we'll be in a position to measure whether something produces an effect or not. If a treatment works, fine. If not, the doctor can quickly turn to something that seems to offer a better chance." ■

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Major Need Cited for Menopause Studies

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early as age 45 or as late as 55—is due in part to their environment.

Billboards, magazines, and television in this country generally portray young women as the epitomy of beauty; older women often become stereotyped as dowdy and behind the times, even though after menopause a woman is just as active physically and mentally as she was earlier. Nothing has been lost except the ability to reproduce.

"Talking helps to prepare people for what they ultimately will go through," Dr. Santoro said. "But in this country menopause has never been a popular subject for discussion.

"In parts of Europe, the picture is somewhat different. In Denmark, for instance, thousands of women visit clinics to receive counseling on menopause as well as evaluation for hormonal replacement therapy or treatment for hot flashes or other symptoms. Their needs are completely addressed."

Both Drs. Crowley and Santoro cited what they described as a "crying need" for menopause research in this country.

"We don't even know," Dr. Santoro said, "why the whole process starts . . . why the ovaries run out of eggs around which follicle cells make estrogen. There's so much to learn."

One of the first questions to be asked in any research program on menopause, Dr. Crowley said, is how to supply needed endocrine hormones in a way that matches normal physiologic patterns.

"Should we give these pills by mouth permitting them to pass through the liver where they produce a series of hepatic [liver] changes?" Dr. Crowley asked. "Some of the changes are harmful. They increase clotting factors. They increase certain proteins in the blood.

"Experimental work already is under way on patches that would convey estrogen through the skin, skin creams, and vaginal routes of estrogen delivery. I think all of those are going to be valuable."

Once a more physiologic pattern of hormonal replacement therapy has been established, Dr. Crowley would concentrate on potential ways to dispose of the side effects of estrogen deficiency, such as osteoporosis.

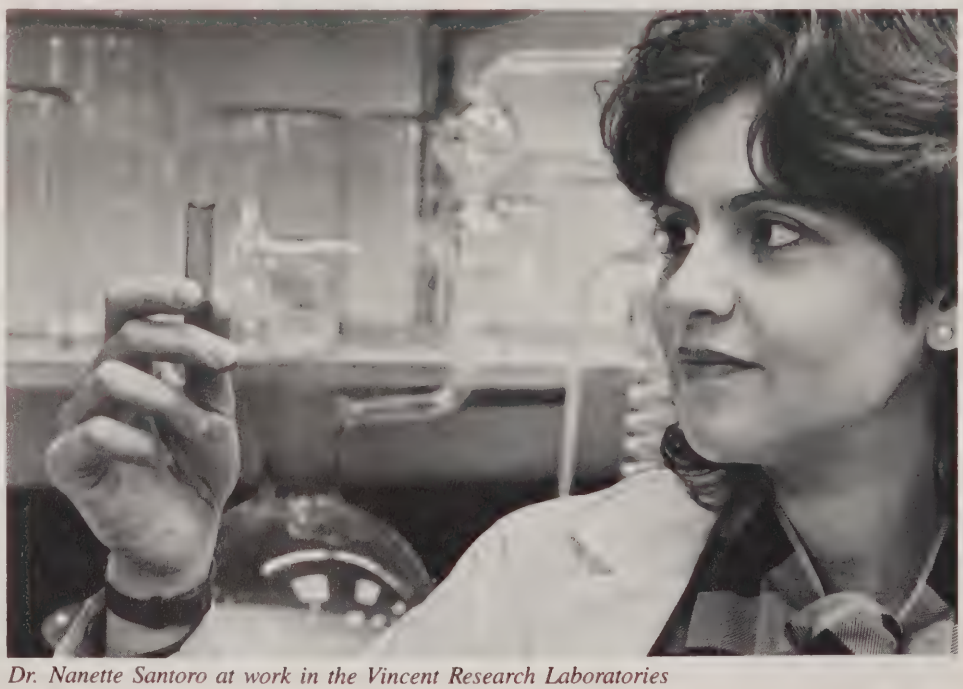
He emphasized the importance of a research effort embracing several specialties and cited work already being conducted at the MGH by Dr. Robert M. Neer, an endocrinologist and Director of the hospital's General Clinical Research Center.

Dr. Crowley said that Dr. Neer is trying to learn whether various regimens of parathyroid hormone administration can halt or even reverse the tendency of women with osteoporosis to lose bone density.

"If there is any form of therapy that can reverse the loss of bone from osteoporosis, its impact would be profound," said Dr. Crowley, who is also Associate Professor of Medicine at Harvard Medical School. "Estrogens are known to do this. They may be working in part through the mechanism of altering parathyroid hormone secretion."

Another area that cries out for more study involves coronary artery disease. Dr. Crowley said that in ways that are not clear women are relatively protected from heart attacks until menopause. During the following 10 years, he said, they do an amazing job of catching up to the male incidence of heart disease.

"Is there some way of preserving the protective status?" he asked. "There is no evidence that estrogen replacement therapy alone can do it. Yet, there is no question about it, just being female does offer an early protective effect. We must know more." ■

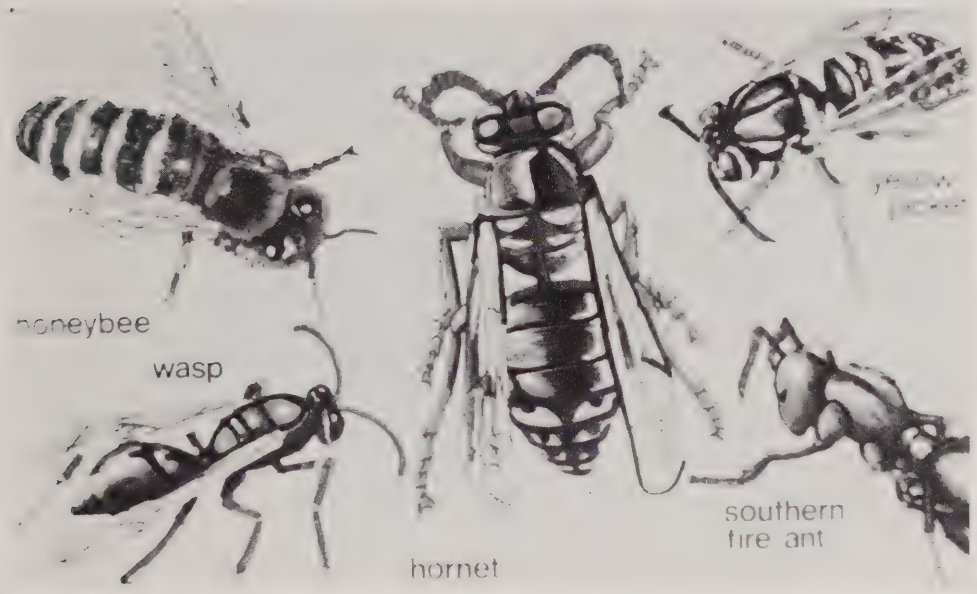


Dr. Nanette Santoro at work in the Vincent Research Laboratories

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 5 June–August 1986

Warding Off Allergic Reactions From Insect Stings



The arrival of warm weather in New England brings with it swarms of unwelcome visitors.

It is the season for stinging insects.

Of those people unfortunate enough to be stung or bitten, the vast majority will endure only slight pain, some itching, and perhaps a small, reddened skin area. The harmless discomfort soon passes.

For some, however, the attack of certain insects—such as wasps, hornets, honeybees, and yellow jackets—may cause systemic, life-threatening allergic reactions.

In New England, yellow jackets pose the principal danger. Similar to hornets but smaller, yellow jackets nest underground or in places like compost piles or brush. They typically have bright yellow and black markings.

To minimize chances of becoming a target of stinging insects, people moving around outdoors should avoid wearing brightly colored clothing, using heavily scented perfume, and walking barefoot through grass, and should use extreme

(Continued on Page 2)

100 Years This Month

When Dr. Fitz Tamed the Appendix

One hundred years ago this June an MGH pathologist prompted a radical change in medical practice that ultimately brought a poorly understood and frequently fatal disease under control.

In a talk on June 17, 1886, at the inaugural meeting of the Association of American Physicians in Washington, D.C., Dr. Reginald H. Fitz recognized the true nature of appendicitis (a word he coined) and urged early surgical removal of an inflamed appendix.

Dr. Fitz's talk stunned his audience, composed of many of the nation's most esteemed practitioners. For the most part, surgeons had considered the abdomen out of bounds to their scalpel. If infection had not already set in, they reasoned, the surgeon might inadvertently put it in (*MGH News,* June–August 1976).

But Dr. Fitz's address made a profound impact. After his death in 1913 at the age of 70, a Harvard colleague, Dr. Frederick C. Shattuck, commented on the classic 1886 paper in a memorial tribute to his friend:

". . . the profession was in a fog and did not know in which direction a safe harbor lay. Fitz not only dispelled the fog but buoyed the channel by combining his pathological knowledge with the rigid analysis of recorded cases, logical deduction therefrom, and such a presentation of results that conviction was inevitable."

In successfully promoting a surgical solution for appendicitis, Dr. Fitz at the

(Continued on Page 6)

EW Nurses Help Mourners to Cope

On an average of 30 times a month, the staff of the MGH Emergency Ward (EW) has to deal with a sudden and unexpected death.

Some people are pronounced dead on arrival in the EW as a result of illness or trauma. Others succumb in the unit even as doctors and nurses there struggle to save them. And still other patients die in an operating room during emergency surgery after being treated in the EW or

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EDITORIAL:

Empathy in a Time of Need

One of the agonies we are never prepared for is sudden and unexpected death. And one of the places where this tragedy is most commonly seen is in a hospital trauma center which by definition deals with the worst emergencies. And so it is no surprise that about .005 percent or 350 of the 69,276 patients a year who enter the MGH Emergency Ward (EW) and its trauma center will succumb.

What is positive about this fact is the response of MGH nurses. In a typical shift the personnel who staff the unit face a continual challenge. They must keep up with a stream of patients coming from all over New England and seen in order of the severity of accident or illness. At the same time the caretakers must devote enough attention to the needs of each patient.

Given the pace of a large city EW, one might expect that even the family of a patient who dies in or before arrival at the EW might be a blur in a hectic day. But nurses in the MGH's EW remember. In addition to helping the patient's family at the time of death, they extend their caring to the aftermath. A Page 1 article tells how these nurses place a follow-up call two or more weeks later to the survivors. These concerned nurses listen with empathy and answer any questions that the family neglected to ask on the tragic day. And often the nurses can offer the resources of a social worker or another health professional. The nurse's call frequently makes a real difference to a loved one trying to cope.

Ending the Snoring Dilemma

Snoring attracts as many jokes as do most human actions. Who knows but what Eve complained about it to Adam that first night in the Garden of Eden. Sawing wood is one humorous characterization of the noisy practice. Comic strips often poke fun at it. Even literature has references. Alexander Pope wrote in "On a Certain Cleric":

"Even in the church,
Where boredom is prolific,
I hail thee first, Episcopalian bore:
Who else could serve as social soporific,
And without snoring, teach the rest to snore."

And Shakespeare wrote in "Cymbeline":

"Weariness can snore upon the flint
When resty sloth
Finds the down pillow hard."

After thousands of years of being the butt of jokes, the snorer is at last getting a sympathetic ear. That ear is coming from sleep specialists rather than spouses. A Page 4 article explains how serious health problems can lie at the root of snoring. That is the bad news. The good news is that often physicians can provide solutions; and that with the new understanding, even when no relief follows, a little sympathy from the spouse might.

Allergic Reactions

(Continued from Page 1)

caution when near uncovered food or garbage.

Doctors strongly advise individuals who have already experienced allergic reactions from insect venom to carry an emergency treatment kit. It contains a syringe already filled with adrenalin (also called epinephrine), a tourniquet to help prevent the spread of venom if the insect attacks an extremity, and a packet of antihistamine tablets.

Dr. Richard A. Moscicki, a Clinical Immunologist at the MGH, said the allergic person should inject adrenalin immediately after the insect stings or bites.

"The drug goes very quickly to the site where it is needed," he said. "It acts promptly to relax constricted smooth muscles in the airway and to reduce dilation of blood vessels. It can also stop the release of chemical mediators from mast cells, part of the process which produces the reaction."

The syndrome, or group of symptoms, which develops very rapidly when a severe allergic reaction takes place, is known as anaphylaxis. The symptoms may range from just minor swelling in the skin, such as hives, to the other extreme in which breathing passages may close, or the patient may suffer anaphylactic shock, a loss of ability to maintain blood pressure.

Usually, the first time a person is exposed to a substance (an allergen) to which he later becomes hypersensitive, no reaction occurs. However, some individuals produce IgE (immunoglobulin E) antibodies to the allergen. The IgE antibodies position themselves on mast cells, found in the lining of places like the throat, bronchial tubes, lungs, intestinal tract, skin, and alongside blood vessels.

Mast cells contain quantities of chemicals, or mediators. The best known of these is histamine. Following a further exposure to the allergen, the IgE antibodies on mast cells combine with the allergen, causing the mast cells to release their chemicals. The redness, swelling, and itching typical of allergic reactions follow.

Photography: Page 1, courtesy of Dr. Richard Moscicki; pp. 3 (upper), 4, 5, 7, 8, Myron Daniels; p. 3 (lower), Robert Crivello; p. 6 (upper), MGH Archives

Drawing: Page 6 (lower), from *Manual of Lower Gastrointestinal Surgery,* courtesy of Dr. Claude E. Welch

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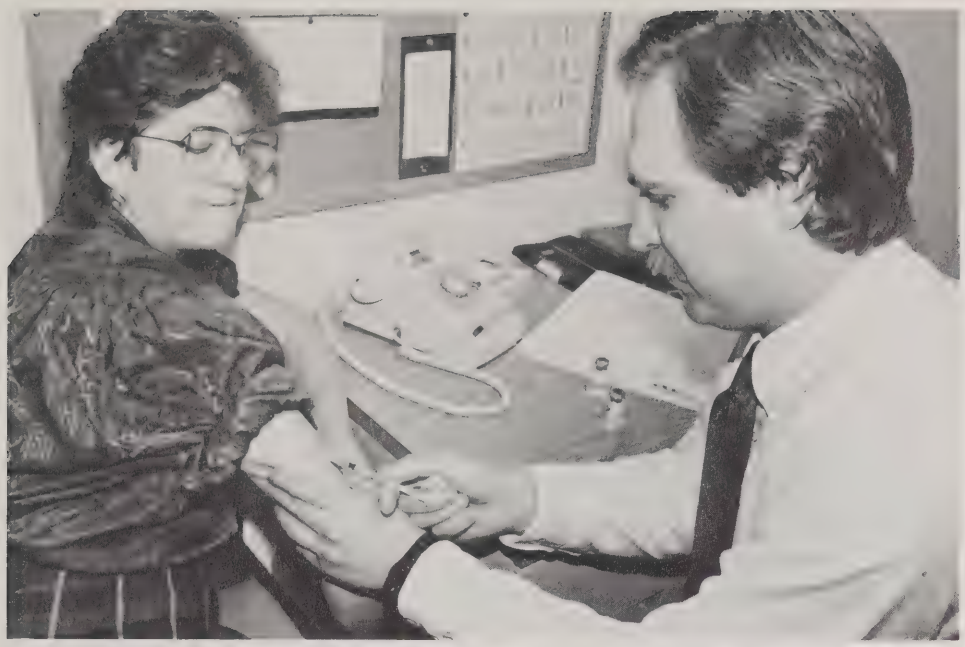


In the offices of Allergy Associates, Dr. Richard Moscicki administers a protective injection to Valerie Longson, who is allergic to the venom of both yellow jackets and honeybees.

Some forms of anaphylaxis do not involve IgE antibodies. Morphine and X-ray contrast media can bind directly to mast cells, causing them to release histamine and other chemical mediators.

Even normally protective antibodies of the IgG and IgM classes, which guard against many kinds of infections, can play an unhealthy role. Under certain circumstances, complexes made up of antigen and IgG or IgM antibodies activate a number of blood proteins called complement. Substances released from complement proteins, called anaphylatoxins, can induce mast cells to release their chemicals and thus precipitate anaphylaxis.

In anaphylactic shock, the blood vessels enlarge in diameter or dilate and become leaky. Like water that normally flows through a narrow pipe suddenly coursing through a wide pipe, the blood pressure can plunge. The heart may not receive enough blood to pump. If the brain is deprived of newly oxygenated blood, the patient may faint, and other organs may begin to falter.

The stinging insects, known as Hymenoptera (meaning membrane-winged), represent only one cause of anaphylaxis. The condition can also arise from an allergic reaction to such foods as peanuts and eggs and to such drugs as penicillin, an antibiotic; thiopental, an anesthetic; and morphine, a painkilling narcotic.

Not long ago, a young woman died of anaphylactic shock after eating chili. The recipe, it turned out, included peanut butter. The victim was allergic to the protein in the peanuts.

Another woman, in her 20s, suffered an anaphylactic shock after consuming a peach and then going jogging. She responded to adrenalin and antihistamines. The situation was most unusual. The peach alone did not cause the anaphylaxis. It resulted from the combined action of the peach and the exercise. This syndrome is now recognized as food-dependent, exercise-induced anaphylaxis.

Studies indicate that approximately one percent of those who take penicillin suffer an allergic reaction. Of that affected group, about one percent are likely to have an anaphylactic episode capable of causing death. Although the percentage seems small, the number of people receiving penicillin each year is large.

Dr. Moscicki, who is also Instructor in Medicine at Harvard Medical School, has been conducting a study of anesthesia-related agents that can sometimes bring on anaphylaxis.

"A patient being prepared for surgery may be given several agents to relax the muscles and induce sleep," he said. "On relatively rare occasions, anaphylaxis may occur 5 to 15 minutes after the drugs are administered.

"We have found that skin testing may be helpful in identifying the causative drug in some situations where it may not be readily apparent. For instance, we know that thiopental and the muscle relaxer succinylcholine can produce anaphylaxis in a susceptible individual."

Experience has shown, Dr. Moscicki said, that as an allergic reaction begins the quick administration of adrenalin will alleviate the problem for most patients.

If a patient's blood pressure drops, large amounts of fluid, usually saline, may have to be given intravenously to replace the volume lost from the vessels.

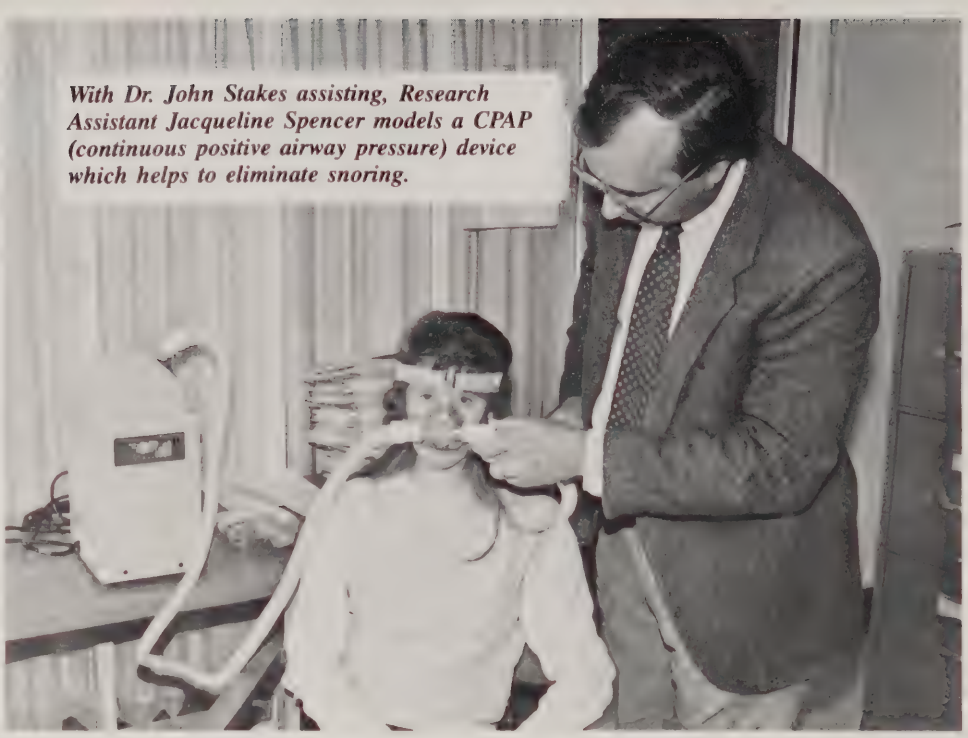
A variety of drugs are available if a patient wheezes from respiratory difficulties or requires treatment of a prolonged course of anaphylaxis.

Still another measure is available to counteract shock. "Anti-shock trousers" have been used on trauma patients to restore blood to the heart and other vital organs. Made from balloons, the trousers were inflated, causing external pressure upon the legs and their blood vessels. The pressure forced the blood up into the

(Concluded on Page 4)

This insect sting emergency kit includes epinephrine (more familiarly known as adrenalin), antihistamine tablets, and a tourniquet.

The Snorer: Both Victim and Villain



With Dr. John Stakes assisting, Research Assistant Jacqueline Spencer models a CPAP (continuous positive airway pressure) device which helps to eliminate snoring.

The complaint is heard again and again: He keeps everybody in the house awake with his snoring!

Instinctively, while the snoring rumbles on, friends extend sympathy to those members of the family condemned to sleepless nights.

In reality, if anyone is being seriously deprived, it is the snorer. His raucous breathing serves as a red flag indicating that he is battling for air. His slumber provides him little rest, often evidenced by sleepiness and catnaps the following day.

Several factors can account for snoring:

Poor muscle tone in the airway—Instead of keeping the breathing passage open, lax muscles may collapse and vibrate when one takes a deep breath.

Excess body weight—Any added fat in the soft tissues of the throat is likely to restrict air flow.

Enlarged tonsils or adenoids—This is the main cause of snoring in children and in many adults.

A receding chin—The tongue may be positioned so far back that it blocks the airway.

Obstructive sleep apnea—The most serious cause of snoring. In apnea, breathing may stop for from 10 seconds to more than 200 seconds before the brain signals resumption.

Dr. John W. Stakes, who directs the hospital's Sleep-Wake Disorders Unit and All-Night Sleep Laboratory (*MGH News*, May 1983), believes that the principal cause of snoring is excess weight.

The neurologist and internist told of a newlywed, a young professional man, whose wife had already abandoned their bedroom because of his snoring. He had no anatomic disturbance in his nose or throat, but even at 150 pounds he weighed too much for his height and build. Advised to lose weight, the patient lost 15 pounds, and his snoring ceased.

Even when the reason for snoring is an obstruction that surgery can overcome, Dr. Stakes often advises the patients to first maximize what they can do for themselves, namely lose weight under proper dietary counseling. If problems persist, the surgery can then take place.

Studies indicate that high blood pressure (hypertension) occurs more often among severe snorers than among non-snorers of comparable age and physical build.

Dr. Stakes said that heavy snorers with hypertension of unknown origin should undergo a study to check for significant apnea.

"Hypertension is one of the by-products of repetitive, nocturnal oxygen deprivation," he said. "This can often be attributed to at least partial obstructive apnea."

Sleep apnea threatens harm only if the temporary cessation of breathing lasts longer than 20 seconds. Besides hypertension, complications that may develop include heart failure and various psychiatric disorders.

Dr. Jeffrey B. Weilburg, the MGH psychiatric consultant for the Sleep-Wake Disorders Unit, said that significant behavioral changes occur in people with obstructive apnea.

Typically deprived by the apnea of deep stages of sleep and subjected to countless arousals during the night, sometimes awakened by their own loud snoring, many individuals later appear at work in a grumpy, depressed, and apathetic mood.

Further, some people experience a series of "microsleeps." They go through

Allergic Reactions

(Concluded from Page 3)

body, in effect giving the patient a vitally needed transfusion.

The many routes by which one can contract anaphylaxis make very difficult the task of picking out people most at risk. While skin testing works well in some situations, such as in detecting hypersensitivity to penicillin, it proves of no benefit in other respects, such as in identifying a threat of anaphylaxis from radiologic contrast media.

In the offices of Allergy Associates in the MGH's Wang Ambulatory Care Center, specialists can examine people for allergies, such as insect sting sensitivity, and provide injection therapy if other protective measures seem ineffective or inadequate.

"Injection therapy is given very carefully because patients are receiving material to which they are known to be allergic," Dr. Moscicki said.

"After the treatment, the patients are asked to wait in our office for at least 15 to 20 minutes to be certain that no reaction from the injection occurs. We have all the equipment and drugs, including adrenalin, at the ready, if needed. However, anaphylaxis in this setting is very rare."

Dr. Moscicki described injection therapy as especially useful in guarding against anaphylaxis due to insect venom.

"The incidence of a severe systemic reaction after being stung a second time ranges from 40 to 60 percent," he said. "A series of injections can reduce that risk to 2 percent or less." ■

the motions of working (automatic behavior, the doctors call it) but repeatedly fall asleep for up to a few seconds at a time.

"Observers may realize that something is amiss," Dr. Weilburg said, "when the person suddenly loses track of a conversation, makes a senseless statement, or perhaps fumbles something in his hands. The patient himself may not be aware of his microsleeps."

Dr. Stakes said that to his knowledge no one has made any around-the-clock electroencephalographic (EEG) recordings of such patients to assess the duration and frequency of microsleeps. But, he declared, ambulatory devices to record the electrical activity of the brain have now become available, permitting such 24-hour studies.

Dr. Weilburg said restlessness, general malaise, and intense sadness can occur among such patients.

In trying to determine whether apnea plays a part, Dr. Weilburg will often ask a spouse whether the patient snores on breathing in or breathing out.

"A snore on expiration may indicate that the airway is not fully open and therefore is vibrating," he said. "It's often a particular snorting—a loud gasping for air—that one hears when tremendous inspiratory forces are needed to open a closed-off airway. During sleep, snorting frequently serves as a tipoff that an apneic event has just concluded."

If the patient sleeps alone, a tape recorder can supply the information the physician needs to further evaluate the snore.

Dr. Weilburg, who is also an Instructor in Psychiatry at Harvard Medical School, has treated depressed, apneic patients successfully with a tricyclic antidepressant drug called protriptyline.

It is well known that there are many more snorers among people of advanced years than in young populations. Dr. Weilburg said recent work by a research team in Pittsburgh indicates there also may be an even higher incidence of sleep apnea in elderly patients who exhibit symptoms of senility associated with Alzheimer's disease.

"This raises an important question," he said. "Does apnea in some of these older people cause a worsening of cognitive decline already brought on by the Alzheimer's symptoms? Further studies may provide the answer."

Dr. Stakes, who is also Instructor in Neurology at Harvard Medical School, urges people with poor muscle tone to avoid alcohol, sedatives, and other so-called sleep drugs in the last few hours before retiring.

"Their use may further depress muscular function," he said, "and exacerbate problems with apnea or snoring.

"The conditions are likely to become more frequent and more severe during episodes of REM [rapid eye movement], or so-called dream, sleep. The REM phase occurs about four to five times a night."

Dr. Stakes advocates a number of simple measures to help produce a restful slumber. Many patients who are simply snorers may benefit, he said, from sleeping face down or on a side because with their tongue hanging forward they may no longer have an interrupted airway.

As the snorer's family complains of being kept awake, his raucous breathing signals a struggle for air.

A tennis ball stitched into the back of a pajama top can be an effective deterrent to snoring because the individual would be unable to lie on his back, the position most likely to lead to snoring. Dr. Stakes pointed out, however, that the technique does nothing to cure the problem.

At the back of the throat, one can see hanging down a mass of tissue known as the uvula and on each side of it the soft palate. To overcome snoring and apnea caused when the uvula and palate are enlarged, some doctors recommend a surgical procedure to remove some of the tissue.

Dr. Stakes questions whether this is advisable. The soft palate helps to give the voice a certain nasal intonation, he said, and when the palate is clipped the intonation is increased. He said patients find that objectionable. He added that the palate acts as a valve to prevent food or fluid from rushing out the nose when one swallows.

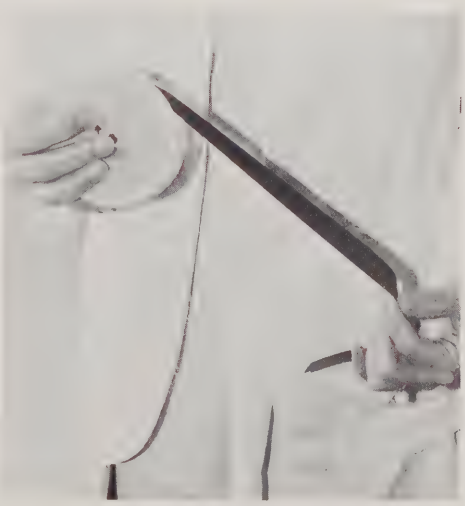
Scores of devices have been introduced to help eliminate apnea and snoring. Many are too uncomfortable to be practical. Dr. Stakes, however, has found that one instrument does a remarkable job.

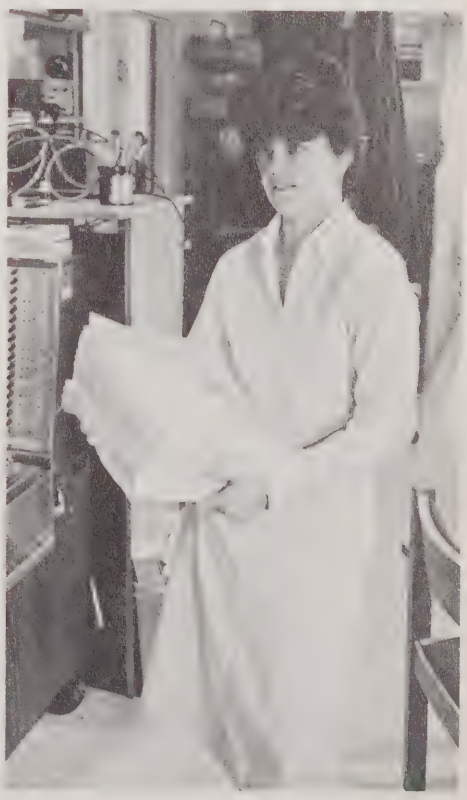
Called a nasal CPAP (for continuous positive airway pressure), the device covers the nose, and during the night room air is pumped continuously through the mask into the nose.

"With the assistance of CPAP," Dr. Stakes said, "breathing is improved, blood oxygen reaches more acceptable levels, and daytime sleepiness resolves as the patient achieves deeper stages of sleep than he has enjoyed in years.

"Although the machine creates a sound like that of a room air conditioner, patients tolerate wearing the mask quite well, and spouses find the noise far less objectionable than the raucous snorting that used to terminate a session of apnea and wake them up." ■

EEG Technician Nancy Carew holds a 1,500-foot-long recording of a patient's all-night sleep test. Seven such recordings are later put on a single roll of microfilm.





A Myth About the Appendix Ended

(Continued from Page 1)

same time was opening the abdominal cavity for operations to cure other maladies in that region of the body. The abdomen no longer was sacrosanct.

Dr. Fitz's arguments on appendicitis led other investigators to focus on that disease. Within three years, some 2,500 articles were published on the subject. By 1950, the number swelled to more than 13,000.

The result of the contributions was inevitable. Once a common cause of death, appendicitis today can be cured with prompt and proper surgical attention.

Dr. Fitz was not the first to identify the so-called vermiform (or wormlike) appendix (it had been described centuries earlier) or to demonstrate its susceptibility to disease. His accomplishment lay in correcting a long-standing belief that appendicitis was an inflammation of the cecum, the first portion of the large intestine, to which the appendix attaches. Indeed, before Dr. Fitz's description, the disease had been known as *typhlitis*, meaning cecal inflammation.

Medical attention was so focused on the cecum that when a perforation of the appendix was mentioned, it was considered a secondary effect of the primary disease. Thus, the consequence was the wrong treatment . . . and, often, death.

The confusion may have stemmed in part from the fact that the appendix in humans has no known function. This is not true in other animals. The rat, for instance, has an enormous appendix, which probably helps in reabsorption of water from the large intestine into the blood stream and in the storage of unabsorbed solid material for eventual excretion as feces.

Dr. Ronald A. Malt, Visiting Surgeon at the MGH, said appendicitis can result from any of several disorders.

"A fecalith [an obstructing mass of feces] in an appendix can trap secretions and other matter behind it, enlarging the appendix and producing infection.

"The appendix is rich in lymph glands, so conditions that can infect these glands might precipitate appendicitis. Moreover, cancers may occur at the base of the appendix, where it joins the cecum. These growths can also obstruct, enlarge, and infect the appendix."

Although the medical approach to appendicitis has changed much over the last 100 years, one aspect has remained the same. The diagnosis still relies almost entirely upon clinical instinct.

"There is no single symptom, physical sign, or test specific for appendicitis," said Dr. Malt, who is also Professor of Surgery at Harvard Medical School. "Experience and intuition provide the diagnosis. After assembling the evidence, the doctor must decide whether the constellation of nonspecific signs and symptoms happens to fit the suspected condition."

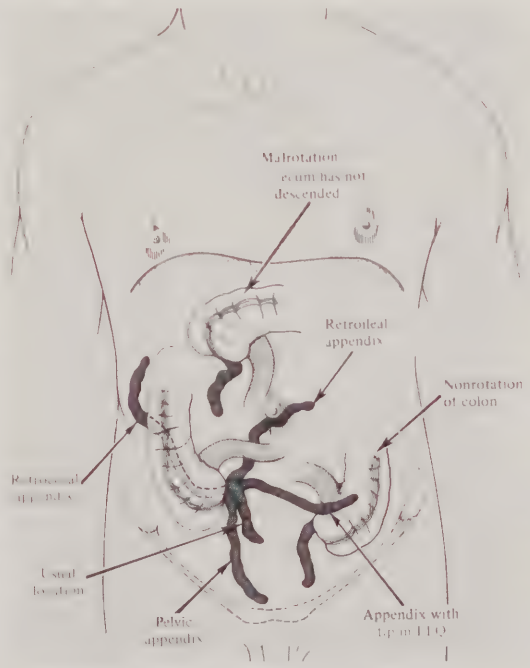
A surgeon may perform many appendectomies, some of which prove unnecessary, or do too few or wait too long, in which case some appendices wind up perforating. When they do rupture and lead to abscesses in the pelvis and elsewhere, what was a minor disease turns into a major one.

Doctors, therefore, seek what is called a "cut point," a point at which there is the best balance between removing too few appendices and not removing enough.

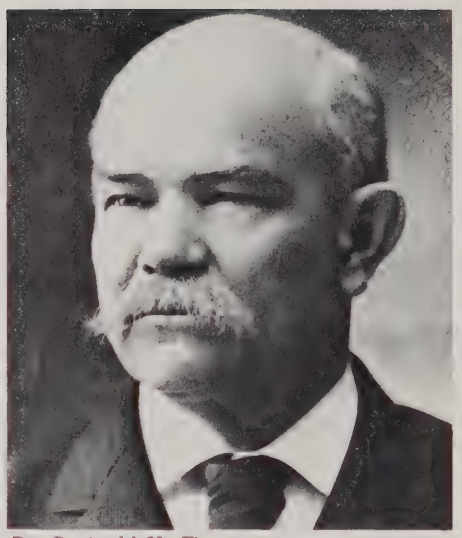
Statistically, it has been found that if a surgeon operates unnecessarily on an appendix about 20 percent of the time, he has struck about the right balance. He is operating neither conservatively nor excessively.

In dealing with children, this balance is liberalized because it is more difficult to diagnose appendicitis in youngsters, and it is safer to operate than to risk gangrene, rupture, and peritonitis (inflammation of the membrane lining the walls of the abdominal cavity).

In 1893 a New York surgeon, Dr. Charles McBurney, helped to ease the diagnostic dilemma by determining where on the abdomen one might feel the maximal tenderness from appendicitis.



Although usually situated in the lower right quadrant, or side, of the abdomen, the appendix is sometimes found in other areas.



Dr. Reginald H. Fitz

"McBurney's point," as the area is called, remains useful in helping to confirm presence of the disease in the right lower quadrant of the abdomen. However, absence of tenderness there would not automatically rule out the condition.

For one thing, the normally two-inch-long appendix might actually be longer. Pain from it could arise in the left lower quadrant and might not even appear to be associated with appendicitis.

Also, an appendix that becomes inflamed might be situated behind the cecum. Not only would any tenderness escape detection in a manual examination but false symptoms of gallbladder disease might arise and confuse the issue.

The proximity of the appendix to other organs can create still more perplexities. Dr. Malt said that it is sometimes difficult to determine whether a patient has appendicitis or an inflammatory bowel disorder, such as Crohn's disease, because they occur within inches of each other.

Since treatment for the two conditions differs, the patient about whom such a question arises may be referred by a community hospital to a teaching hospital such as the MGH.

Referrals to a teaching hospital might also be in order for appendectomy candidates who have a blood coagulation problem, a low resistance to infection, are on anticancer chemotherapy, or are being immunosuppressed to guard against rejection of a transplant, for example.

Appendicitis does not respect class or rank. In a presidential address to the Southern Surgical Association in 1982, later published in *Annals of Surgery*, Dr.

A meeting of the Emergency Ward Bereavement Committee. The members, all RNs, include, from the left: Sandra Jutras, Kathleen McDonald, Patricia Mian, Ann Stangby, Cathleen Costello-Reitman, Roseanne Marino, and Ines Jackson-Williams.

Nurses' Calls Comfort Grieving Families

(Continued from Page 1)

MGH–MEEI (Massachusetts Eye and Ear Infirmary) Trauma Center.

About 350 of the more than 69,000 people brought to the MGH EW each year are either dead on arrival or die soon after.

For the most part, the task of notifying, consoling, and assisting the patients' families rests with a group of EW staff nurses, among them psychiatric clinical nurse specialists.

In the vast majority of hospitals, the contact between emergency staff personnel and grieving relatives ends once the family leaves the hospital. At the MGH, the course is different. The nurse, who has been involved with the family in the EW, will call the home two or more weeks later to inquire how the bereaved are doing and whether the hospital can assist further in any way.

Patricia Mian, RN, a psychiatric clinical nurse specialist, said that by the time the call is made the shock of the death has begun to subside.

At the height of their emotional strain, people do not always hear or fully comprehend what is said to them. When they receive a call from someone they had contact with earlier, they usually welcome the opportunity to further discuss what had happened in the EW. They find emotional relief in speaking to someone who they know cares to listen.

The MGH Emergency Ward has been staffed for years by nurses particularly skilled in relating to patients' families. Two years ago Miss Mian and the nursing staff established a formal program on how to best help families in situations involving the loss of a loved one.

"Seven or eight staff nurses who were particularly interested in this kind of endeavor formed a Bereavement Committee," she said. "During the following six months we developed specific nursing guidelines for interventions. The follow-up calls after a death represent a key part of our program."

The nurses meet every two or three weeks to discuss issues which proved especially difficult and to gain support for each other. An open invitation to attend the meetings is extended to the EW's entire nursing staff.

The Ladies' Visiting Committee at the MGH aided the nurses' program by financing the renovation and refurnishing of a private EW room to serve family mourners.

Even when a person is technically dead on arrival in the EW, efforts continue for another 30 to 45 minutes if there is any chance for resuscitation. If surgical intervention is attempted, the struggle may last even longer.

When there are still signs of life in a patient, the nurse assisting the family may remain with the relatives for many hours.

Miss Mian recalled spending an entire day with the parents of a youth critically hurt in an early morning car crash. Efforts in an EW trauma room and later in an operating room failed to save the teen-ager. The parents then made an often heard request. Could they see their child? The arrangements were made immediately.

Two weeks later, Miss Mian called the mother and heard some concerns.

"She felt that if the municipal ambulance which brought her son to the Emergency Ward had reached the accident scene sooner, her son might have survived," Miss Mian said.

"She also had an impression that while her son was receiving treatment in our EW, the staff team suddenly left his side to look after another patient. This was not so.

"People sometimes need to be reassured that everything possible was done that could be done."

Questions often deal with specific aspects of the treatment, such as "Did they put a tube down his throat? My family doctor said that was the thing to do." The nurses strive to answer all questions.

Relatives always wonder whether the patient had been in pain to the very end

(Concluded on Page 8)

G. Rainey Williams of the University of Oklahoma Health Sciences Center spoke of some famous people who had been stricken with the disease.

In 1830, he said, a perforated appendix is believed to have claimed the life of one of the most famous surgeons of his day, Dr. Ephraim McDowell, who on Christmas Day in 1809 had performed the first successful elective removal of an ovary (ovariotomy), opening the way for surgery of the female abdomen.

Dr. Walter Reed, famed for his research on yellow fever, died in 1902, also from a perforated appendix.

Frederic Remington, acclaimed for his paintings of the Old West, died in 1909 at the age of 48 following removal of a ruptured appendix.

One of the most famous patients was Britain's King Edward VII, eldest son of Queen Victoria. Stricken with appendicitis only a few days before his scheduled coronation in June 1902, Edward underwent emergency surgery at Buckingham Palace. Although his appendix was not removed, an abscess was opened and drained. The coronation was delayed while Edward recovered, and finally was held on August 9th. ■

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Nurses Give Bereaved an Emotional Outlet

(Concluded from Page 7)

and seek assurance that this was not so. And they ask, "Did he say anything before he died? Did he have any last words?"

Some also feel pangs of guilt. "I should have called for the ambulance earlier," they declare, or "He had complained of pain. I wish I had forced him to go to the doctor."

Suicides, especially among teen-agers, create very difficult situations. Usually, the family feels quite helpless and may need some kind of psychotherapy. A family's anguish may have started long before the suicide took place.

A few people insist that their child would never have committed suicide. Deaths from drug overdoses can sometimes make it a debatable issue that is never really resolved.

On occasion, EW nurses find themselves consoling families struck by tragedy for the second time in just a short period.

Miss Mian recalled the death of a man from a heart attack two years after his son, a murder victim, was pronounced dead in the EW.

"The relatives were so distraught they had a difficult time differentiating between the two deaths," she said. "Back in the same setting where they had earlier experienced much distress, they called out for the son when actually they meant the father."

Another example of a family reliving an earlier tragedy occurred when a daughter died in an automobile accident two years after a son lost his life under similar circumstances.

The first time in the EW the family never saw the young victim. When the second tragedy occurred, they felt it important to be with their child. The family spent considerable time at the side of the daughter in a private examining room.

In another instance, the identity of a young man, critically injured in a construction accident, was in question. As surgeons fought to save him, the family periodically sent pictures from the EW to the OR in an effort to facilitate a positive identification. The patient died later in an intensive care unit (ICU).

Generally, when a patient succumbs in an ICU, nurses on that floor will follow up the death, but since an EW nurse had spent 10 hours with the accident victim's family, she made the customary call to the home.

On occasion, the call must focus in part on the future well-being of the survivors. The person who died may have been the family's sole wage earner. For families in need, the nurse who calls can ask a hospital social worker to arrange for public assistance.

In an effort to learn what is particularly helpful to these families, Miss Mian and other EW nurses have reviewed calls made to the relatives of 70 Emergency Ward patients who died between October of last year and March of this year.

A feeling that proved to be widespread among the families was that because they had received a follow-up phone call the person who died had been someone special to the EW staff, not just a stranger. That conviction helped the mourners to cope. It also enabled them in the follow-up contacts to pose questions that they either did not think to ask while in the EW or were afraid to bring up.

In her conversation with the families, Miss Mian said she hears one comment more than any other:

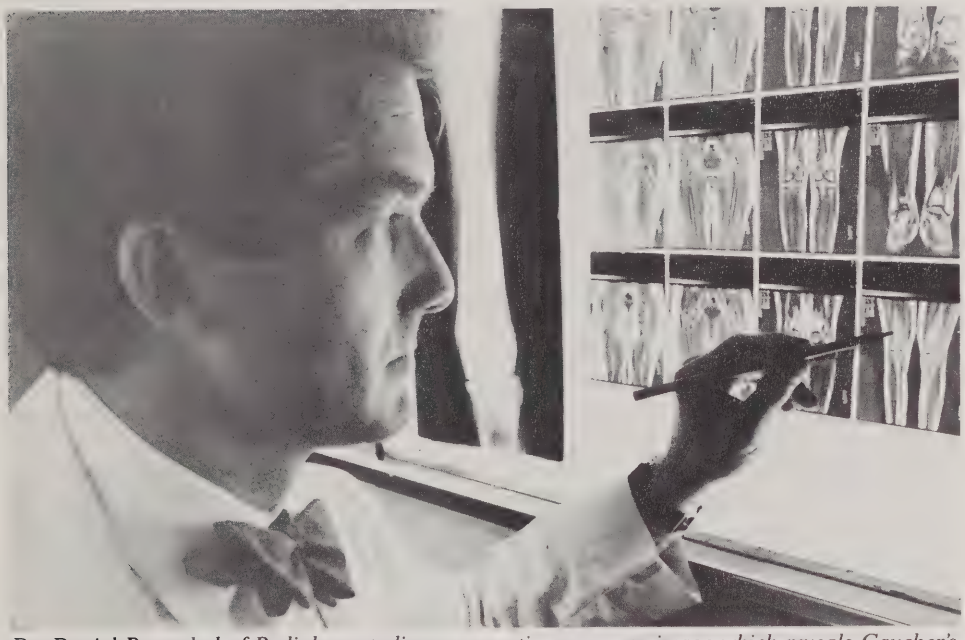
"I'm glad that he was taken to the Mass. General because I know that people go there from all over the world for treatment. I'm sure that if there had been a way to save him, your hospital would have found it." ■

To inquire how they are coping, Susan O'Leary, RN, calls the family of a patient who died a few weeks earlier in the MGH Emergency Ward.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 6 September 1986

Test of Unusual Disorder Picks Up Warning Signs



Dr. Daniel Rosenthal of Radiology studies a magnetic resonance image which reveals Gaucher's disease in a patient's thigh bone.

One of medicine's newest diagnostic imaging tools is helping physicians make headway against a disease which has been a challenge for more than a century.

Pioneering studies of magnetic resonance imaging at the MGH and other centers have demonstrated an exceptional MRI sensitivity to disorders of bone marrow, where blood cells form.

In particular, MRI appears to surpass all other imaging techniques in detecting osteonecrosis, a complication of many maladies whereby areas of bone lose their blood supply and are thus "dead."

At the MGH, researchers have taken this work a step further with regard to osteonecrosis that often arises from Gaucher's disease, an inherited enzymatic disorder first described by a French physician, Dr. Phillippe C. E. Gaucher, in 1882.

"We have had an opportunity to study a large number of Gaucher patients in various stages of their disease," said Dr. Daniel I. Rosenthal, an MGH skeletal radiologist. "By looking at the Gaucher cells in the bone marrow, using MRI, we have found that the anatomical sites that become involved are predictable.

"The abnormal cells appear first in specific locations and then spread in a regular predictable pattern through the body. The distribution of abnormal tissue thus reflects the stage of the disease."

Since osteonecrosis seems to occur in Gaucher's disease only when the illness reaches a certain severity, awareness of a patient's early course might help physicians prevent or at least minimize future potentially major complications. Many patients who develop osteonecrosis, for example, must later undergo joint replacement surgery that might be prevented by early treatment.

(Continued on Page 2)

Low-Fiber Diets May Derail Digestive Process

Many Americans go about their daily activities unaware that their western dietary life-style has helped to bring on a gastrointestinal disorder which can have serious consequences.

The malady, called diverticulosis, often arises when diets lack adequate bulk, usually provided by foods high in fiber. This is the nondigestible portion of plant foods such as fruits, vegetables, and whole grains. The deficiency of fiber in the diet allows gases and refined foods to create abnormally high pressures in the large intestine, or colon.

The organ reacts to excessive pressures in much the same way as a garden hose. Bulges occur at weak points. But while a garden hose might quickly burst, the colon is more resilient. The bulges on the colon wall often turn into pouches or sacs of tissue. These are called diverticula.

While the above steps occur in people developing the disease, specialists still debate the precise origin of the affliction. One of every three Americans between 45 and 60 and two thirds of those older than 60 are believed to have some diverticular disease. Most get along well, although they may endure periods of diarrhea, constipation, or gas pains.

The disorder is sometimes described as "left-sided appendicitis" because the discomfort tends to occur in the lower left

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EDITORIAL:

Experts Need More Data on Fish Oil

It seems that new books on dieting are emerging every day. And books on nutrition keep arriving from the publishers. The fitness craze continues to engulf the nation at cocktail parties as well as bookstores. It is axiomatic that the diet books that sell the most work the least. Human nature dictates that we look for the easiest way to achieve our goals. If the brass ring dangles before our hands, we seize it. Should we have to leave the comfort of our chairs to clutch it, then that is another matter. Fad diets are inevitably the brass ring near our hands. They tend to be relatively easy to follow and often bring quick though temporary results —even if the weight loss comes from dehydration or jeopardizes our health in the process.

Nutrition is another matter. Good nutrition principles are, or should be, derived from scientific study. Even with nutrition, however, science often moves in fits and starts and sometimes takes a false step or walks down a blind alley. Cholesterol, for instance, was theorized to be harmful if ingested in large amounts. Even more certain was the fact that all cholesterol in the blood contributes to the potential for coronary artery disease. But *was* this a fact? Apparently not. Evidence accumulated in the last few years distinguishes between two types of cholesterol. One, low density lipoprotein (LDL), remains a villain that clogs the arteries and traps blood clots as a spider snares insects that trespass on its web. High density lipoprotein (HDL) wears the white hat in this western. HDL fights the sticky LDL. In high enough numbers HDL apparently reduces the threat of a heart attack though realistically speaking the HDL levels are usually insufficient to negate the total serum cholesterol.

Now enter the fish oils. A Page 4 article points out that some ethnic groups whose diet consists largely of foods high in fish oils tend to avoid coronary artery disease and perhaps reduce the chance of arthritis and other inflammatory disorders. Fishermen love this theory. Americans who tended to shun fish are beginning to rival the Eskimos. This revolution in diet may well make Americans healthier. Nevertheless, the information on fish oil remains in its infancy. We may yet find an analogy to HDL and LDL under the woodpile. And we may learn that in our haste to flee heart disease we may encourage some other major problem. All of this is no reason to avoid fish. To the contrary, a *reasonable* diet of fish oil seems prudent. But in a country noted for fads, let's not *overdo* the fish consumption until a lot more evidence mounts.

Gaucher's Disease

(Continued from Page 1)

Gaucher's disease results from a deficiency of an enzyme called glucocerebrosidase. Its job is to dispose of lipids (fats) which emanate from the membrane of red and white cells when they break down in the blood stream. Without the enzyme, the lipids accumulate in cells in the bone marrow, causing bleeding tendencies and anemia, and in the spleen and liver, causing those organs to enlarge.

Inheritable only when both parents carry the disease, Gaucher's has three forms observable in patients: infantile, juvenile, and adult. The first and often the second types are characterized by severe, progressive neurological involvement and almost always prove fatal. The third spares the neurological system and develops as a chronic disorder involving mainly blood cells and bony elements.

In the United States, about 90 percent of Gaucher patients have the adult form, and of these about 80 percent have some

Letter to the Editor

Dear Editor:

I read an article in your paper about a young foreign girl who received a fibula transplant to correct a bone disease in her leg (*MGH News*, April 1985]. Dr. [Jesse B.] Jupiter performed a similar operation on my right forearm with remarkable results.

I had a very serious bone infection. Most of my radial bone was removed and replaced with the fibula bone from my left leg. After 18 hours, it was determined that the transplant would have to be done over. Even after all this, blood circulation could not be obtained in my arm. Dr. Jupiter and his team did not give up. They tried something they had never used before. A new drug was flushed through my veins for an hour and as a result blood began to flow.

Thinking back, I am amazed, and grateful, at how these people can, after working a full day, go all night and part of the next day, run into serious problems, and still not give up. How easy it would have been to say that they gave it their best shot and let it go at that.

Today, after three years of battling with a broken arm, I am doing things I thought I would never do again.

Sincerely,
John R. Palatino
Ludlow, MA

orthopedic complication. The adult type may set in around the ages of 6 or 8 but go undiscovered until the late teens.

The infantile and juvenile forms of the disease have no predilection as regards race, but the adult type is most prevalent among Jews of Ashkenazi (Central or East European) origin.

It is estimated that the affliction strikes approximately one of every 2,500 Jews born in this country. Some 1,500 Gaucher patients live in the New York metropolitan area alone.

Dr. Henry J. Mankin, MGH Chief of Orthopaedics, has long had an interest in Gaucher's disease and for the past several years has served as a consultant on the disorder for the National Institutes of Health.

Of more than two dozen Gaucher patients scanned by the magnetic resonance technique at the MGH, most were either under Dr. Mankin's care or were referrals of Dr. John Barranger and his team at the N.I.H. Clinical Center in Bethesda, Md.

With the support of an Eastchester, N.Y., family, efforts to care for Gaucher patients and to find ways of conquering the disease have taken great strides at the MGH.

The Orthopaedic Service has announced establishment of the Harriet and Marvin Klein Clinical Unit to meet the needs of Gaucher patients whose problems principally affect the skeletal system. In addition to a $100,000 gift to endow the unit in the hospital's planned twin towers (part of its Capital Campaign to replace outmoded patient care floors), the Klein family has begun a series of contributions to help underwrite Gaucher research costs.

Dr. Mankin became acquainted with Mr. and Mrs. Klein about two years ago when their daughter, Marci, in her mid 20s, developed what he described as "an acute Gaucher's crisis" near a knee.

Ravaged by severe bone pain, swelling and limited movement of the affected part, and a high fever, Marci, a patient at another institution, was operated on by Dr. Mankin. After a hospitalization of more than four months, the young woman returned home free of infection, restored to reasonably good health, and looking much better.

The effects of adult Gaucher's disease can vary considerably. As Dr. Mankin wrote in a newsletter of the National Gaucher Foundation which has members throughout the United States and in at least 13 other countries:

"The bone changes do not seem to parallel other manifestations of the disease. A patient with severe involvement of the liver, spleen, and bone marrow may have only mild bone changes while one with almost no problem with organ enlargement, blood clotting, or anemia may have severe and crippling bone disease."

The mildest and most frequent bone change in Gaucher patients, he wrote, is a minor shift in the configuration of the ends of the largest and fastest growing long bones (thigh bone, shin bone, arm bone, etc.). Orthopedists refer to this as "failure to remodel." On an X ray, the end of the bones takes on a characteristic flask shape, but no symptoms arise.

Sometimes the skeleton will suffer a significant loss of bone and bone mineral, either generalized or affecting just one area to an extraordinary degree. The condition, called osteopenia, can weaken the bones seriously and make them more susceptible to fractures.

In Gaucher's osteonecrosis, if the section of bone that dies is in the shaft of the bone, the portion may be "silent" and only appear as a dense area on an X ray. But if the disease occurs at the end of the bone where it participates in a joint (especially the hip or knee), the bone becomes weakened and may undergo tiny fractures. Severe disability can result.

Doctors do not yet have a clear-cut treatment for Gaucher's disease. "We have essentially been supportive," said Dr. Mankin, who is also Edith M. Ashley Professor of Orthopaedic Surgery at Harvard Medical School. "If a patient breaks a bone, we fix it. If a patient gets osteonecrosis of the femoral head [the top of the thigh bone], we replace it. If a patient develops a cyst, we pack it."

An "Orthopaedic Hot Line" is maintained for people with Gaucher's disease through the MGH offices of Drs. Mankin (617-726-2943) and Samuel H. Doppelt, who is both an orthopedic surgeon and endocrinologist, (617-726-8534).

In addition to treating patients, both specialists are deeply involved in collaborative research efforts with N.I.H. investigators.

Dr. Doppelt said that at the MGH, in work supported by the National Gaucher Foundation, "we've come up with some extraordinary data to suggest that these patients don't absorb vitamin D or calcium very well. We're looking at a possible way of giving vitamin D which may turn the whole disease process around as far as limits on the amount of bone they make are concerned."

The patients do not properly absorb vitamin D when given by mouth. But it can be administered intramuscularly or

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With the help of a special microscope, Dr. Samuel Doppelt analyzes the framework of a bone specimen from a Gaucher patient to quantitate bone loss.

Photographs: Pages 1, 3, 4 (lower), Myron Daniels; pp. 4 (upper), 5, courtesy of Massachusetts Division of Marine Fisheries

Artwork: Page 6, from *Manual of Lower Gastrointestinal Surgery,* courtesy of the publisher, Springer-Verlag, Inc., New York; p. 7, MGH Medical Art Department; p. 8, courtesy of Goethe-Museum, Frankfurt, West Germany

Can a Fish Diet Stave Off Heart Disease?

Two groups of people living half a world apart have come under intensive medical study because they appear to enjoy protection from certain diseases.

The studies of Eskimos in Greenland and residents of fishing villages in Japan seem to point to a diet rich in fish oils as a reason for the protection.

Both Eskimos and the Japanese under study have a low incidence of atherosclerosis and resultant coronary artery disease. In addition, psoriasis is markedly less common among the Eskimos than in western populations, raising the possibility that fish oils may also have an anti-inflammatory influence.

Fish, especially deep-sea, cold-water species such as salmon, tuna, sardines, and mackerel, contain an abundance of certain fatty acids (known technically as omega-3 fatty acids) which are found only in low concentrations in traditional western diets.

Like vegetable oils which do not contribute to a buildup of cholesterol in blood, omega-3 acids in fish oils are also unsaturated, but they differ from vegetable oils in a way that may benefit humans.

To understand the importance of this uniqueness, one must know that in carrying out their mission of blood clotting, platelets in blood need fatty acids to help produce chemicals called prostaglandins. One of these prostaglandins is *thromboxane,* made in the body from a polyunsaturated dietary fatty acid (*arachidonic acid,* or AA) derived from vegetable oils and grains.

Mackerel provide abundant oils believed to be especially beneficial in the human diet.

Thromboxane causes platelets to become sticky. They then tend to collect at sites in arteries where damage has occurred. This initiates the process that can lead to atherosclerosis. When this disorder involves arteries of the heart, coronary heart disease results.

The fatty acids in fish oils, in particular *eicosapentaenoic acid* (EPA), interfere with AA. Being very similar to AA chemically, EPA can make its own form of thromboxane, a type much less potent than the kind produced by AA. So the platelets wind up less sticky.

From a practical point of view, one does not want to reduce or eliminate arachidonic acid in the body because that would create a condition called essential fatty acid deficiency, which is a disease in its own right.

EPA encourages the production of a beneficial prostaglandin called *prostacyclin.* It develops in cells which occupy the lining of arteries. The normal function of prostacyclin is to inhibit platelet clotting action.

Ten years ago, Dr. Alexander Leaf of the MGH flew to the Far East to check reports that heart disease was not a problem in coastal fishing villages in Japan. With Dr. Yasuo Kagawa of Jichi Medical School in Tochigi, Japan, Dr. Leaf spent a month touring villages on the mainland as well as on Okinawa and other islands.

They verified reports of populations largely free of coronary artery disease. The villages boasted unusually large numbers of still vigorous, elderly citizens.

Drs. Leaf and Kagawa felt that diet was responsible for the good health, but it was not until a few years later when Danish scientists studied the Greenland Eskimos that fish oils entered the picture.

Gaucher's Disease

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intravenously. Also, in place of regular vitamin D, the researchers have available a much more active form called 1,25-dihydroxyvitamin D.

Bone marrow transplants have been suggested by some as a way to deal with Gaucher's, but Dr. Mankin said that "in these kinds of patients with so much illness, such transplantations are potentially hazardous. One has to be very sick to be a candidate, and the sicker the person is the more difficult the procedure becomes."

At Bethesda, Dr. Barranger and his colleagues have found the site of the genetic DNA molecule where the missing enzyme in Gaucher's disease is normally produced.

Dr. Mankin said:

"If we could remove some cells from a patient's body and, through some system of genetic engineering, program their DNA to make the enzyme, we could put the cells back into the patient and he would begin his own enzyme production, thus ending the disease. That may not come about for years, but I think that eventually it's going to be possible." ■

Gaucher patient Maria Garcia of Montclair, N.J., chats with Marian D'Amato, RN, in the MGH's General Clinical Research Center.

A fisherman unloads his catch.

The Danes were trying to learn why the Eskimos seemed protected from atherosclerosis and also why they tended to bruise easily. The studies led to discovery of the EPA-altered function of their blood platelets.

Since the Eskimos depended on foods rich in fish oils, Dr. Kagawa of Japan retraced the steps that he and Dr. Leaf had taken earlier and found that people in the Japanese fishing villages also had high EPA levels. In addition, Dr. Kagawa checked Japanese farming villages where heart disease was more prevalent and found lower quantities of EPA.

Dr. Leaf, who founded and directs the MGH–Harvard Cardiovascular Health Center, currently heads a study to determine how much EPA a person needs to derive a benefit.

"We have 100 people divided into two groups," he said. "The plan provided for one group to take three grams of an EPA supplement daily for eight weeks and then nine grams a day for eight weeks. The other group began taking six grams a day for eight weeks with the amount scheduled to rise to 12 grams during a second such period."

(At the concentration of EPA used in the MGH study, six grams would be equivalent to the amount of EPA found in a four-ounce serving of Chinook salmon, sockeye salmon, or albacore tuna.)

Dr. Leaf, who is also Ridley Watts Professor and Chairman of the Department of Preventive Medicine and Clinical Epidemiology at Harvard Medical School, said it is becoming clear that some of the major diseases in society can be modified, or even prevented, by specific nutritional intervention.

"There are early steps in the development of atherosclerosis which have to occur before cholesterol in the blood can actually deposit in the vessel wall," he said. "From what we know about fish oils, we may have several places where we can intervene and block the disease process before cholesterol becomes involved."

In apparently blocking some inflammatory processes, EPA acts much the same as when it interferes with the production of thromboxane to change platelet activity.

In this instance, EPA seems to prevent the AA production of compounds known as *leukotrienes,* which promotes inflammation. Some types of leukotrienes derived from EPA prove 30 to 100 times less potent in most of their biological activities than their counterparts made from arachidonic acid.

The MGH Arthritis Unit has been collaborating with the laboratory of Dr. K. Frank Austen at Brigham and Women's Hospital in Boston in studying the activities of two forms of leukotrienes (B4 and B5). Dr. Austen's laboratory has also measured the effects of fish oil diets on the capacity of white cells in humans to produce these mediators.

At the MGH itself, work by the MGH Arthritis Unit on fish oils has been primarily at the experimental animal level. Specifically, the research has involved mice which developed a condition very similar to human systemic lupus erythematosus, a potentially fatal connective tissue disorder.

In most instances, the death of mice with this disease was directly caused by a complication called autoimmune glomeralonephritis, which also affects humans. It leads to inflammation and eventually total destruction of kidney function.

The sick mice developed irreversible and fatal kidney disease when their diets contained plant-derived or animal-derived lipids (fats), the kinds most often seen in meals in western countries.

"When we put other mice on a diet containing fish oils, they had a dramatic protection from the development of glomeralonephritis," said Dr. Dwight R. Robinson, an MGH rheumatologist and member of the hospital's Arthritis Unit.

Dr. Robinson said the treatment of glomeralonephritis in humans is often unsatisfactory, but modification of the disease in animal models may someday lead to a new way of treating people.

Whether fish oils alone can counteract lupus remains to be determined. However, some forms of this disorder are marked by severe enlargement of lymph nodes, and researchers have demonstrated that fish oils can prevent or delay this enlargement.

"We know that we can modify the lupus process in at least two organ systems with EPA," Dr. Robinson said. "We are now extending our studies to other animals which develop other manifestations of lupus to see what effect EPA might have on those processes."

At other institutions, including the Albany, New York, Medical Center, patients with rheumatoid arthritis have been given marine lipid supplements. Preliminary results indicated a mild but definitely beneficial impact on the severity of that disease.

Looking to the future, Dr. Robinson, who is also Associate Professor of Medicine at Harvard Medical School, said the importance of changes in fatty acid composition in tissues is probably less certain for inflammation than for atherosclerosis.

"I think it's unrealistic," he said, "to expect that we are going to grossly modify all inflammatory diseases by changing tissue lipid composition. These disorders probably differ in their mechanisms in at least subtle ways." ■

The oceans yield a great variety of seafood containing healthful polyunsaturated fats in varying amounts.

CT Scans Ease Care for Diverticulitis

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side of the abdomen, more specifically in the sigmoid colon which attaches to the rectum.

Between 10 and 25 percent of diverticulosis patients progress to a more serious stage called diverticulitis. This means that the tissue pouches have become infected and inflamed, usually the result of waste material being trapped in them.

Frequently, antibiotics alone will control this painful condition, but if abscesses develop or the sacs perforate, surgery may be necessary.

An abscess, for instance, can penetrate some contiguous structure, creating an abnormal passage (fistula). The passage may extend from the colon, or bowel, to the bladder, skin, or another portion of bowel.

If an abscess perforates, the result can be life-threatening peritonitis, an inflammation of the membrane covering the abdominal cavity.

"Many patients with diverticulitis get better largely on their own," said Dr. Robert H. Schapiro, an MGH gastroenterologist. "Following a mild attack, a liquid diet for several days and perhaps some antibiotics taken orally may prove to be adequate treatment."

Even in the presence of an abscess, if it is not a blatant one, a physician often prescribes medication first in the hope that it will ameliorate the situation.

Dr. Schapiro said such tests as a barium enema (the instillation of barium sulfate into the colon to permit X-ray studies) and a sigmoidoscopy (a visual examination of the colon using a sigmoidoscope) can cause added pressures in the organ. Therefore, he said, it is often preferable to hold off these procedures until the patient's condition has stabilized.

"In the past," he declared, "if a patient were acutely ill and tests disclosed a serious abscess, the individual often underwent an emergency colostomy [the diversion of body waste for collection in a special bag]. After the infection had been treated for a couple of months with antibiotics, a surgeon usually resected [cut out] the area of infection. Still later, the patient required a third hospitalization for closing of the colostomy.

"By the time they were over, the treatments had dragged on for up to six months with the patient enduring the colostomy bag during much of that period."

Today, a radiologist using computed tomography can see the abscesses and go on to drain them, thereby defusing the situation (*MGH News*, April 1986). A surgeon can do his work only a few days later, and the patient soon goes home, the overall treatment entailing only one operation and one hospital stay.

The recovery time depends on whether the treatment was given on an elective or an emergency basis. If elective and the patient had improved with antibiotics and the radiological drainage procedure, the postoperative course might be 10 days. If the patient had major surgical attention, then, depending on the individual's age and ability to bounce back, convalescence could take from six to eight weeks.

Large intestine with diverticular disease in the sigmoid area (between the broken lines). Diseased portion faces surgical removal.

Dr. Schapiro said that since the patients customarily undergo removal of some bowel, they might experience a little more diarrhea than normal, but, generally speaking, there should be no real change in bowel function.

After recovery, the diverticulitis patient should adopt and stick to a high-fiber diet. Since fiber is not absorbed as a nutrient, it passes into the colon as bulk. In conjunction with plenty of fluids, the fiber helps to keep the stool soft and move it along. Commercial preparations are available to supplement dietary fiber intake, if necessary.

Dietary fiber conveys other benefits. Since fiber-rich foods generally take longer to eat and fill more space in the digestive tract, they can assist in appetite control and weight loss.

Each year, in an effort to overcome constipation, Americans spend more than $250 million on over-the-counter laxatives. Heavy use of such drugs to promote bowel movements can become habit-forming, and over time, without help of the laxatives, the body's natural "emptying" mechanisms may fail to function. Overuse can also lead to diarrhea.

Excessive reliance on mineral oil, a popular laxative, should be guarded against because it may reduce absorption of certain vitamins (A, D, E, and K). And mineral oil may also interact with drugs such as anticoagulants (given to avoid blood clots) causing undesirable side effects.

Dr. Schapiro discovered long ago by personal experience why diverticulosis has been labeled as a disorder of affluent western cultures.

"In the early 1970s," he said, "I spent a year in Uganda where so-called roughage was a virtually universal component of diets. Although I was the only gastrointestinal consultant in the African nation of seven million people, and I taught at the country's central referral hospital, I never encountered a patient with diverticulosis. If it was present, it was rare indeed."

Although roughage often appears to relieve discomfort associated with diverticulosis, and even prevent it, the cause of this disease remains open to debate.

"Similarly in 1962, when I went into gastroenterology, nobody understood lactose intolerance," said Dr. Schapiro, who is also Associate Clinical Professor of Medicine at Harvard Medical School. "The disorder was associated at the time with irritable bowel syndrome [also known as spastic colon] which produces real symptoms of illness but no evidence of actual disease. Then, somebody discovered that the problem was due to the intolerance for milk sugars.

"Irritable bowel syndrome is a waste basket of many things, and I think diverticulosis probably results from an irritable bowel. I am convinced that many of the conditions attributed to this syndrome eventually will be shown to stem from some biochemical imbalance, perhaps too much of a hormone in the gastrointestinal tract causing people to have excess motility [spontaneous movement]."

Dr. Schapiro also believes that diverticulosis may have some genetic basis.

"Some people develop the condition while in their 30s, a very early age," he declared. "When the colon is found studded throughout with diverticula, but there are no bowel complaints, I have to conclude that there has to be some genetic predisposition." ■

What Causes Some Individuals to Walk In Their Sleep?

The robust, 34-year-old auto mechanic stood outside his front door, blood coursing down his face from a deep head cut.

It was 1:30 in the morning, but the injured man had not been attacked or in a motor vehicle accident while out on the town. The pajamas he wore laid those possibilities to rest.

A trail of blood leading to crushed bushes nearby, coupled with the man's history, presented a clear picture of what had happened.

Although he recalled retiring at about 11 p.m., he evidently got up while still asleep, walked out of his bedroom onto a second floor porch, and then toppled 20 feet into the bushes below.

Since age 29, the patient sleepwalked about twice a year, always early in the night. Although he was a moderate-to-heavy beer drinker, no connection with alcohol intake or with any life stresses seemed apparent. He had no history of blackouts or previous head injuries. Neurological tests proved negative.

After hospital treatment for the injuries suffered in the latest episode, the patient planned to receive psychiatric follow-up, but as a precaution against another sleepwalking incident, he and his wife resolved to handcuff themselves together at night.

Serious injuries during sleepwalking are relatively uncommon, but sleepwalking itself occurs in an estimated one to six percent of the general population. Studies indicate that among children between the ages of 5 and 12, about 15 percent have walked in their sleep at least once.

Physicians emphasize that these children are no more disturbed psychologically than youngsters who have never sleepwalked. The young sleepwalkers customarily outgrow their condition. Its persistence into adulthood, however, warrants suspicions of coexisting problems and justifies a thorough psychiatric evaluation.

Sleepwalking falls into a classification of disorders known as parasomnias. Other parasomnias include bed-wetting (enuresis), grinding of teeth (bruxism), and night terrors. Patients with these problems characteristically do not remember having experienced them.

They usually develop during stages three and four of what is termed non-REM (nonrapid eye movement) sleep, which tends to occur during the first few hours after retiring.

Stages one and two can be described as kinds of dozing that are often observed in excess among the elderly. They may claim they just had their eyes closed, that they were not really sleeping, but chances are they were in the early stages of non-REM slumber. REM sleep is generally associated with dreaming and is a deep phase of sleep.

Dr. Theodore A. Stern, an MGH psychiatrist and director of a clinic specializing in the care of chronic psychiatric patients, said no one knows what causes phenomena such as sleepwalking.

"It has been suggested," he said, "that it may be triggered by some arousal stimulus that startles the individual and produces a shift in the stage of sleep the person is in.

"This shift need not be due to anything having emotional content, such as worry, but simply something, a loud noise perhaps, which disrupts the normal pattern of sleep."

Dr. Paula K. Rauch, a child psychiatrist at the MGH, said that some people sleepwalk only when away from home; on a business trip, for example. Unfamiliar with the environment, the patient might be ill at ease and consequently unable to sleep soundly.

During sleepwalking, some patients respond when spoken to and even engage in purposeful activities. Dr. Stern said the medical literature tells of patients who, in fear of sleepwalking, tied a rope around themselves to keep from wandering, only to discover later that even while asleep they managed to untie the knots.

"The level of responsiveness is very variable, however," said Dr. Rauch, "and that is what makes sleepwalking so potentially dangerous. Someone who could unlock a door while sleepwalking, for instance, might still be oblivious enough to his surroundings to unhesitatingly step off a porch roof."

Researchers estimate that among persistent adult sleepwalkers the risk of injury is as high as 72 percent. The sleep environment, therefore, should be made as safe as possible by such measures as locking windows and exterior doors, putting gates on stairways, and sleeping on the first floor, if possible.

Nocturnal wanderings may suggest a more serious disorder than originally suspected.

Some sleepwalkers who later undergo EEG (electroencephalographic) studies of the brain's electrical activity turn out to have nocturnal epilepsy.

Dr. Stern pointed out that people can have a predisposition for a seizure disorder by virtue of some past injury or illness, and that these seizures can be partial in scope rather than the typical, generalized attack leading to shaking, inability to speak, or loss of consciousness.

"For some unknown reason, the thresholds for seizures are different during sleep," he declared. "As their stages of sleep change, certain people seem more vulnerable to having abnormal electrical discharges occur in the brain and cause behavioral manifestations."

EEGs of sleep-deprived patients help

(Concluded on Page 8)

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Nightmares Differ From Night Terrors

(Concluded from Page 7)

specialists to diagnose nocturnal epilepsy. The patient is first asked to stay up all night. Then, while awake but tired and perhaps even a little irritable, the person takes the EEG test for signs of any abnormal areas in the brain. When the patient finally falls asleep, the test is administered again to discern and study the transition phases of the slumber.

Dr. Stern, who is also Assistant Professor of Psychiatry at Harvard Medical School, believes nocturnal epilepsy is more common than suspected. "Since the condition is often treatable with anticonvulsant medications," he said, "it is important to identify its presence and not write it off as just sleepwalking."

Night terrors have been likened to nightmares, but they differ both in their origin and course. Unlike terrors, which develop in sleep stages three and four, nightmares are a product of REM sleep.

"The nightmare is a frightening dream," Dr. Rauch said. "It has a story line which the patient can often speak of later. In contrast, the night terror has no story line. It is simply an arousal from sleep associated with a sensation of fear. The patient awakening from a night terror may initially be inconsolable, then go back to sleep, and not even remember the incident in the morning."

To treat night terrors, sleepwalking, and other parasomnias, doctors often turn to benzodiazepine drugs, such as Valium. For bed-wetting in childhood, however, the medication of choice usually is an antidepressant.

"Nightmares are best treated with support, rather than drugs," Dr. Stern declared. "For recurrent nightmares during adulthood, psychotherapy could be helpful."

Dr. Stern said there are times when nightmares may increase dramatically. Suppose a person took a barbiturate regularly to induce a more restful sleep, and after several weeks the drug began to lose its effectiveness, as many medications often do. The individual may initially raise the dosage, then stop taking the barbiturate. When the person stops, the amount of time spent nightly in REM sleep and having nightmares may grow significantly.

How would a physician deal with this? "First of all," said Dr. Stern, "the drug should be tapered gradually. Then the patient should be advised that he may dream more. At the same time, he should be reassured that he is not going out of his mind.

"Some nightmares reflect stresses in one's daily life, such as anxiety over an upcoming test at school. But this is not universally so. That's what makes this so complex."

Although humans devote a third of their lives to sleeping, Dr. Stern said that essentially its study is a very new science.

"Most of us have very little understanding of what sleep is, what goes to make it up," he declared. "Very little is taught in school about sleep disorders.

"EEGs were only discovered about 50 years ago. The association between sleep and dreaming became clearer only about 30 years ago. And it's only been in the last 15 or 20 years that many sleep disorders were first described in the literature. So we're really talking about a relatively new field.

"Only as the technology increases will people begin to increase their understanding of the whole range of sleep disorders and how to deal with them." ■

Henry Fuseli's
The Nightmare (III)
circa 1785–1790

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 7 October 1986

Diverse Group Evaluates the Perils of Child Abuse

Balloons Open Clogged Heart Valves

When Prich Kol arrived in the Boston area nine months ago as a refugee from his native Cambodia, poor health overshadowed his prospects for a better life.

Plagued since the age of 8 by rheumatic fever, the 21-year-old man amassed such scarring around his heart's mitral valve that now it could barely open to let blood through.

The valve normally channels blood, newly replenished with oxygen, into the heart's left ventricle or pumping chamber. From there, the blood courses through an aortic valve into the body's main artery and recirculates.

The narrowed (stenotic) opening of Mr. Kol's mitral valve gave him the functional disability of a person years older. Severe shortness of breath limited his ability to walk. On several occasions during exertion, he fainted. At night chest pains often awakened him.

Dr. Roger Pasinski, a pediatrician and internist at the MGH's Revere Health Associates, brought the young Lynn resident's plight to the attention of Dr. Richard R. Liberthson, an MGH pediatric and adult cardiologist.

"The patient's clinical examination, X rays, and electrocardiogram all revealed marked evidence of severe rheumatic mitral stenosis that we rarely see in a man his age in this country," Dr. Liberthson said.

He arranged to have Mr. Kol undergo a procedure in use at the MGH only since July of last year.

Just as MGH specialists in cardiac catheterization often inflate a balloon within a coronary artery to dispose of a blockage, now they sometimes also position a balloon within a clogged heart valve and inflate the balloon to pop the valve open.

In a two-hour session, Dr. Peter C. Block, Director of the hospital's Cardiac Catheterization Laboratory, and Dr. Igor F. Palacios performed the technique called a mitral valvotomy on the Cambodian patient.

"The procedure restored his blood flow and breathing capacity so well that he was able to go home the very next day," Dr.

(Continued on Page 4)

Dr. John T. Quinby, in private practice since 1943, still makes house calls when necessary. See story on house calls on Page 5.

Each day in courts across the land, judges face the task of deciding whether to rearrange the lives of children for their well-being.

Following alleged abuse or neglect by one or both parents, under what circumstances can a youngster be safely returned to the parents' custody? At what point must the child be resettled elsewhere?

"In many cases, the ruling appears obvious," said Gene M. Smith, Ph.D., an MGH psychologist. "The evidence might demonstrate that the son or daughter should be sent home with some reasonable remedial steps to be taken by the family, or that the child should be transferred to another home without delay."

But often there are complicated "what if" cases. Judges concede that they sometimes go home at night and agonize. "Did I make the proper decision? Did I send this child home to a dangerous situation?" Or, "Did I take the youngster away when an alternative approach would have served just as well?"

After discussions with a diverse group of 95 experts on mistreatment of children, Dr. Smith concluded that there was not a sufficiently comprehensive and uniform mechanism for selecting, organizing, and evaluating information to help guide court decisions.

Thus, for the past two years, he has coordinated a massive effort to develop a so-called "risk list," one that could reliably indicate the degree of danger confronting a young child when specific adverse circumstances exist in a home.

Supported in part by grants from The Cabot Family Foundation, The Permanent Charity Fund of Boston, and the Commonwealth of Massachusetts, the MGH psychologist first searched the literature to identify all possible aspects of

(Continued on Page 2)

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EDITORIAL:

High Technology and House Calls

House calls. The older patients remember them. Many elderly physicians miss them. And a few still make them. As the nation moves toward a predictable glut of doctors, competition may even drive more physicians to take up the practice.

A Page 5 article in this issue describes MGH practitioners who still make some house calls. These physicians outline a strong case for them. One reason is that observing a patient in the home can provide an insight not always available in an office. A flaking coat of paint in an old house might lead a pediatrician to a quicker diagnosis of lead poisoning. A knowledge of the family's interaction at home helps outline other problems central to acquiring or overcoming disease. And the Page 5 story notes that observing the family at home helps the caretaker decide whether the home support system is adequate to leave a patient there or to suggest hospitalization.

There is also much to recommend the house call as a way to discipline today's young physician to skills more imperative away from the high technology of a hospital office. With only the contents of a little black bag, the physician may be more likely to nurture the intuitive skills that characterize many gifted diagnosticians. One also learns more quickly to develop the senses of touch, hearing, smell, and sight.

There is much then that a skilled physician can achieve in a home visit. Unfortunately in 1986 there is much more that he cannot accomplish. In part there is the matter of simple logistics. A physician can see more patients and devote more time to them if there are no traffic jams or parking problems to encroach on the schedule. For a number of conditions the old skills are today totally inadequate. New diagnostic and therapeutic devices are often essential.

On the one hand the high tech medical devices tend to make the physician seem or actually be more impersonal. On the other, the stethoscope, tapping the chest or abdomen, using one's God-given senses all bring patient and doctor physically close. Fortunately for the patient, it does not have to be an all or nothing phenomenon. Whether physicians make house calls or not, the best practitioners manage to walk the narrow path between impersonality and early twentieth century medicine. The World War II era marks roughly the turning point between now and the time when compassion was frequently *all* the physician could offer the dying patient. So often today's technological arsenal enables the well-trained practitioner to effect a cure. How especially fortunate the patient who gets back his life from a skilled *and* compassionate physician.

Child Abuse

(Continued from Page 1)

child abuse and neglect. Then, armed with a basic list, he went back to the front lines and sought advice from every type of professional involved in the problem. Together, they compiled a total of 93 possible perils.

The experts and others recruited along the way—a total of 131 people—then set about evaluating each hazard to determine the degree of danger it would represent if no action were taken to correct the problem.

The large study panel included 13 judges, 15 lawyers, 19 court investigators, 8 probation officers, 20 staff personnel from the Massachusetts Division of Social Services, 18 social workers, 10 pediatricians, 6 psychiatrists, 13 pediatric nurses, and a miscellaneous group of 9 other specialists.

In assessing the chances for harm, the panel used a five-point scale. Zero meant

Letter to the Editor

Dear Editor:

The April issue is very interesting, especially the stories, "When Well People Claim Illness" and "Patients Meet to Discuss a Rare Disease."

Patients and medical personnel with uncommon conditions will be interested in learning that the *Encyclopedia of Associations*, published by the Gale Research Company of Detroit, Mich., has directory entries for a large number of foundations and associations concerned with diseases and conditions.

I am a librarian and used this directory a few months ago to help a lady who wanted to know if there was a lupus support group. There is.

Many of these groups are not well known to persons with a medical problem or to medical personnel. For example, there are an estimated two million U.S. residents with epilepsy but only 10,000 members of the Epilepsy Foundation of America.

Most libraries—public, academic, medical, etc.—will have a current or recent edition of the encyclopedia, which is revised every two or three years. The encyclopedia has a key word index which helps locate the association(s) of interest.

Yours truly,
Thomas K. Lindsey
Amherst, MA

the particular risk posed no danger; one, slight danger; two, moderate; three, severe; and four, very severe.

By averaging the ratings given by the experts, Dr. Smith and his colleagues obtained a convergence of opinions which had the highest level of accuracy in speci-

fying the comparative danger of the various risk items.

Reporting on the project in late August at the annual meeting of the American Psychological Association in Washington, D.C., Dr. Smith said the reliability of the ratings by the 131-member panel was .98. But, he added, it was possible to attain a high degree of reliability by averaging the ratings of as few as eight experts. Their accuracy in specifying dangers came to .84.

Agreement between randomly selected pairs of individual raters brought only a modest accuracy score: .40. "That finding," Dr. Smith said, "highlights the need for improved procedures for evaluating evidence bearing on individual cases of child abuse or neglect."

The paper presented in Washington was coauthored by Francis G. Poitrast, Chief Justice of the Juvenile Courts in Massachusetts; Sister Dorothy Quinn and Sister Ann Fox of Lumen Vitae, Inc., a nonprofit agency dedicated to combatting the mistreatment of children; Philip Lavori, Ph.D., a statistical expert in the MGH Psychiatry Service; and Dr. Michael S. Jellinek, Chief of Child Psychiatry at the MGH.

The manuscript listed the 93 risks and the mean level of danger judged for each by the full study panel. Some examples of the ratings follow:

- The residence is isolated and beyond the surveillance capability of neighbors or other potential monitors. Mean danger = 1.25.

- Child seems wary and unusually fearful of physical contact with parents or other adults; avoids eye contact and seems frightened, anxious, overvigilant, and distrustful. Mean danger = 2.67.

- Parent frequently calls the son or daughter demeaning names and ridicules the child's inadequacies. Parent often expresses hatred for the offspring, wishes that the child had never been born and were dead, etc. Mean danger = 3.32.

- Child shows new and old signs of physical injury: fractures, strap marks, cuts, burns, bruises, welts, swellings, contusions, etc. Medical history shows injuries of suspicious origin. Mean danger = 3.98.

Dr. Smith and his team sought to learn whether mean danger ratings were influenced by the profession, sex, or amount of child protective experience of the rater.

"Lawyers gave the 93 items somewhat lower mean ratings than the other professions," he said, "but this was the only significant difference in danger-attribution associated with professional affiliation.

"There was a tendency for the danger ratings of females to be slightly higher than those for males, but this tendency was not statistically significant."

The amount of experience with child abuse/neglect cases had no important relationship to the danger ratings.

How well do people agree with themselves when the question of assigning risk to the same list of 93 possible perils is put to them on separate occasions? Dr. Smith asked 45 of the original 131 panel members to undertake the evaluations a second time after two to six months had passed. The reliability of the retest results ranged from a low of .40 to a high of .89 for a median score of .71.

With the active cooperation of Chief Justice Poitrast and his staff, Dr. Smith's team is presently investigating the value of the risk list in predicting the outcome of some 400 cases processed through the Boston Juvenile Court. Studies will begin soon in three other courts in the state.

Also, when a child returns home, still in potential danger of abuse, the state's Division of Social Services conducts periodic on-scene inquiries and relays its findings to the MGH study group.

The research team, in addition, strives to learn the attitude of parents when they visit their child in a foster home. Do the parents bring gifts or show other signs of thoughtfulness and love? Are they inappropriately critical? Does the child welcome the visit or seem relieved when the parents leave?

The various studies may extend over five, even ten, years, but the results will show whether the risk list concept, or some modification of it, has practical worth and can serve a useful social function.

"What we know already," said Dr. Smith, who is also Associate Professor of Psychology at Harvard Medical School, "is that the 93-item list is comprehensive; each item represents some facet of child mistreatment; and the complete list covers the full range of danger from slight to very severe.

More than one million children come to the attention of authorities each year be-

cause of abuse or neglect. Of that number, two-to-five thousand die each year.

Dr. Smith said:

"If we can develop more systematic, practical, and useful ways to guide the decision-making of judges, social workers, and others in child mistreatment cases, perhaps we can reduce that toll." ■

Photographs: Pages 1, 5, 7, 8, Myron Daniels; p. 3, posed photos courtesy of Children's Protective Services; p. 4, courtesy of Dr. Igor Palacios; p. 6, from *Plain Pictures of Plain Doctoring,* courtesy of Dr. John D. Stoeckle

Drawing: Page 4, courtesy of Dr. Igor Palacios

New Balloon Method Of Mending Valves A Boon to Aged

(Continued from Page 1)

Palacios said. "Pulmonary function tests [while pedaling a stationary bicycle] before and after the valvotomy documented the patient's improvement. He continues to do well."

Only a handful of medical centers in the United States and abroad, principally in France, employ the balloon method of repairing tight mitral and/or aortic valves. Although the technique is still considered experimental, many heart specialists regard it as a boon to the elderly who often suffer from multiple illnesses and might not be able to withstand the rigors of open heart surgery.

As this account was prepared, the MGH had performed mitral valvotomies on 35 patients (aged 13 to 87), the world's largest number by any one center, and aortic valvotomies on 15 patients (most in their 70s or 80s), the largest patient group in whom the heart was approached via a major vein in the groin.

(The aortic valvotomy technique at some hospitals calls for threading the balloon through a main artery in the thigh because the valve can then be approached without going through most of the heart. But this sometimes involves many blood transfusions to keep the patient stable.)

The vast majority of MGH patients who underwent a mitral or aortic balloon procedure improved. Although the quality of the results varied, most significant limitations, such as fatigue or shortness of breath, were resolved.

One of the 35 patients in the mitral series died. After an effort to free a rigid valve with a balloon proved inadequate, the patient underwent difficult open heart surgery to replace the valve with a prosthetic one. She failed to survive that operation.

Improving a stenotic heart valve by inserting a balloon and inflating it with a saline solution is not new to cardiology. Catheterization specialists for a number of years have employed that technique to treat narrowed pulmonic valves in the heart. The valve controls blood flow from the right lower chamber (ventricle) into the pulmonary artery which then carries the blood to the lungs to receive fresh oxygen.

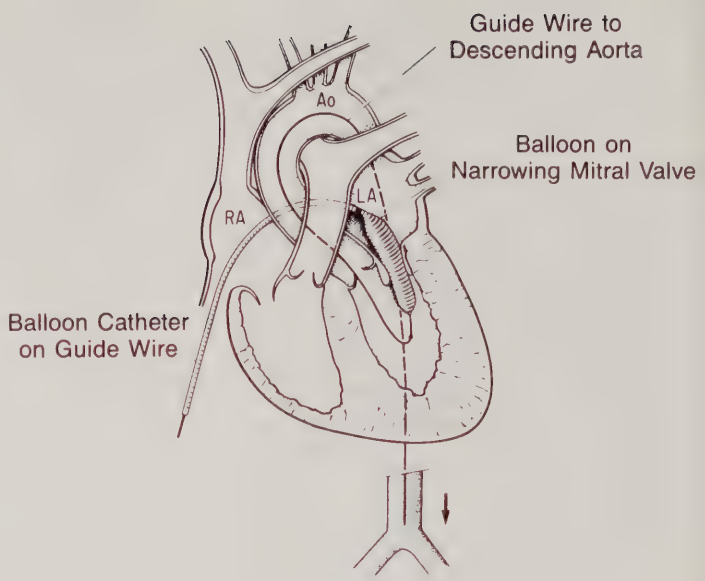


Diagram shows a balloon fed through a major vein into the heart's right atrium (upper chamber), then into the left atrium through a pierced septum (wall), and inflated within the mitral valve. The guide wire continues on to the aorta (main artery) to maximize support.

Speaking on valvotomies at an MGH Medical Grand Rounds, Dr. Block said that the pulmonic valve involves low pressure primarily and can easily be opened with a balloon. Usually the amount of blood that is regurgitated is unimportant because the right ventricle can easily tolerate the activity.

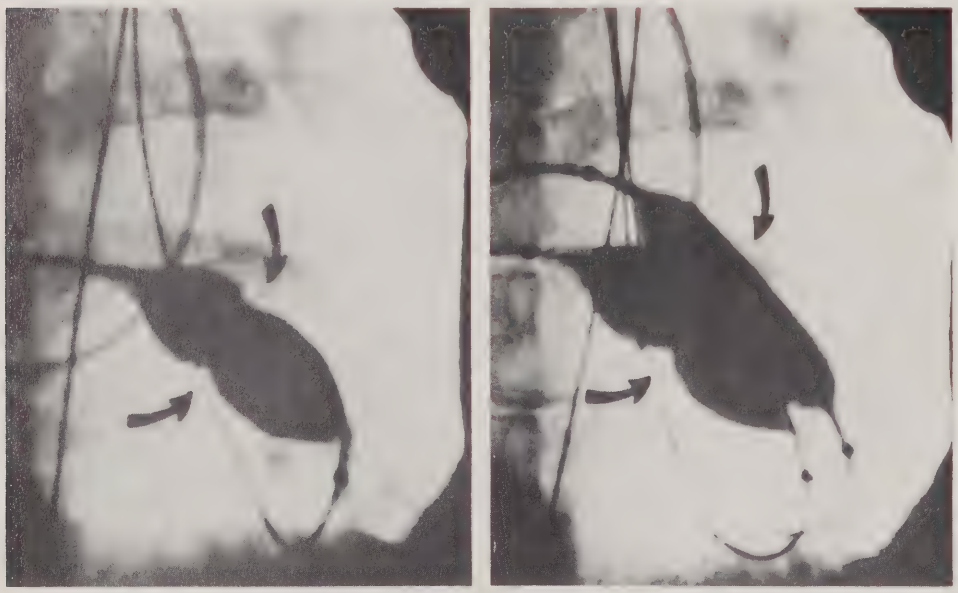
Repairing the mitral and aortic valves becomes more complicated. Calcification often accompanies rheumatic scarring in narrowing a mitral valve, and the stenosis also builds up pressures which back up into the pulmonary vein. This causes fluid from the blood to enter the lungs, making breathing difficult. As for an aortic stenosis, which generally affects older people, it is usually characterized by a presence of heavy calcium deposits.

The repair procedure for either valve begins with insertion of a wire into one of the body's two major veins (inferior vena cava) at the groin. The wire is advanced through the vessel into the heart's right atrium (upper chamber). Then, over the wire, the specialist threads an "introducer sheath." The wire is then withdrawn and replaced with a needle which must be used to puncture a hole in the wall (septum) which separates the right and left atria.

The sheath can now be moved forward through the hole into the left atrium. The needle is pulled out, and the wire inserted once again. Now the sheath can be removed, leaving only the wire.

The cardiologist advances the wire to and through the mitral valve and, with exterior guidance, to the aortic valve, thus giving the wire maximum support within the heart.

In his Medical Grand Rounds lecture, Dr. Block said that "once the track is in



At left, a fluoroscopic view of a balloon inflated in the narrow opening of a mitral valve. When the valve is particularly large, two balloons may be inserted (right photo).

place, passing a balloon over the wire is straightforward, like sliding a roll of paper towels down a string. The roll has no choice but to follow the string into the appropriate position."

If a patient's mitral valve turns out to need a larger-than-usual balloon, two wires can be extended to that valve and two balloons inserted into it.

When a balloon is inflated within either the mitral or aortic valve, the passage of blood through the heart stops for up to 18 or 20 seconds. Repeatedly, patients, who receive only a local anesthetic, tell of a feeling of warmth, but no adverse effects have been noted. With reopening of the appropriate valve and deflation of the balloon, blood flow from the heart (cardiac output) quickly resumes.

Theoretically, as a valve cracks open, breaking a calcium barrier, a bit of calcium can travel through the blood stream to the brain and cause a stroke. But Dr. Block said that of some 200 valvotomies performed to date around the world, very few have had this complication. Even in conventional surgery, he said, such clots called emboli are not common occurrences.

The possibility also exists that manipulating a valve can cause it to leak afterwards. For complications such as that, a surgical team always remains on standby for installation of a prosthetic valve. In the MGH series, one patient developed mitral regurgitation, but he overcame his problem without the need of an operation.

Since mitral and aortic valvotomies were introduced relatively recently, physicians do not know the long-term results of the procedure. Drs. Block and Palacios, however, performed valvotomies on 10 mitral patients in Venezuela early in the series and have conducted six-month follow-ups on their condition.

"All were young . . . the oldest, 44; the youngest, 13," Dr. Palacios said. "In repeat catheterizations, we found that the improvement they showed as a result of their valvotomy held up well."

Six-month follow-ups are planned for all MGH valvotomy patients. "I think the mitrals are going to turn out to be very good," said Dr. Block, who with Dr. Palacios also serves on the faculty of Harvard Medical School. "I don't know about the aortics. In addition to what we learn from our own experience, I'm anxious to see what the French tell us." ■

Remembering the Doctor's Little Black Bag

Medicine's growing reliance on highly complex techniques, such as computed tomography and magnetic resonance imaging, to diagnose disorders raises an interesting question:

When physicians routinely made house calls, how did they manage to get by with just the contents of a little black bag?

"Some of the greatest clinicians I studied under didn't have fancy tools but relied mainly on their instincts," said Dr. Arthur S. Pier, Jr., a Senior Physician at the MGH, who at 73 still makes a few house calls a day as part of his practice.

"Take Wyman Richardson. This MGH physician [the son, brother, and uncle of several noted MGH doctors] was a genius at reading a blood smear. He could tell right away whether the patient was without disease or had some particular disorder. He had a great talent."

At times, Dr. Pier has imitated his mentor. He recalled being summoned one late afternoon to a Back Bay home where a woman, about 80, was sick. She refused to allow relatives to take her to the hospital.

"She appeared awfully pale when I entered the home but just sat in a chair and wouldn't budge," Dr. Pier said. He took a few drops of her blood, made a smear on a glass slide, returned to his office and, after staining the slide, looked at it through a microscope.

"She had a clear-cut case of pernicious anemia," he said. "I started her that night on liver extracts, and she picked right up."

Today, as a precaution, the patient might be hospitalized pending test results.

In addition to equipment for drawing blood samples, the average doctor making a house call carries a stethoscope to listen to heart, lung, and other body sounds, an otoscope to inspect the ears, an ophthalmoscope to examine the interior of the eyes, apparatus to measure blood pressure, a percussion hammer to study nerve and muscle reflexes, and an assortment of medications.

These customarily include Adrenalin for emergency use to combat shock (an abrupt collapse of blood circulation) and morphine for use as a pain-killer or to calm anxieties in a patient who may be having trouble breathing.

Basically the tools assist the physician's natural senses of vision, hearing, and touch.

With his stethoscope, the doctor routinely listens for any sounds that indicate abnormal function of the heart and lungs, and he also delivers short, sharp taps with his fingers to the patient's chest and back.

"Tapping is one of the most time-honored diagnostic procedures in medicine," Dr. John T. Quinby, another Senior Physician at the MGH, declared. "It tells you in an admittedly rough way what is hollow and what is solid. With this technique, you can tell if the lungs are clear or obstructed. You can also get a pretty good idea of the size of the heart because the percussion note changes when your tapping reaches the borders of the heart."

Percussion also reveals a great deal

(Concluded on Page 6)

Most patients visited in their homes by Dr. Quinby are in advanced years and have multiple disorders.

In 1940, when this photo was taken, house calls represented 40 percent of all doctor-patient encounters.

Relying on Sight, Sound, and Touch

(Concluded from Page 5)

about the abdomen. The percussion note offers a way to judge the size of the liver, spleen, and other organs, and whether the bowel is obstructed.

The timber and quality of bowel sounds heard through the stethoscope can also identify sites of obstruction. The sound emanating from the blockage would be high-pitched, a kind of reverberating sound as if somebody were blowing across the top of a soda bottle.

By feeling with the hands, one can detect particularly tender places on the abdomen and any localized swelling. Greater tenderness when the hand pressure eases (rebound tenderness) could indicate peritonitis, an inflammation on the surface of the abdominal cavity, possibly even a perforation.

Occasionally even the eyes play a role in diagnosing an abdominal problem. If a person had a swollen gallbladder, perhaps due to some bile duct obstruction, the examining physician might be able to look across the abdomen and see the bulge more easily than he could feel it.

Personal experience helps to guide a doctor in making diagnostic judgments. When a patient has a sore throat or a fever, for instance, Dr. Pier often considers what is going around at the time. Is it the flu season? Or is some other infection rampant?

Dr. Quinby, who is 74, said that when a fairly serious infection accompanies a high fever, it is a good practice to administer an antibiotic right away and not wait for a laboratory report on a culture test to confirm a diagnosis.

Dr. Leo B. Burgin, a retired MGH Senior Pediatrician, remembers when he had to manage without antibiotics. During his early medical practice, he often treated patients at their home simply because there was not much more that a hospital could do for the particular condition.

The 80-year-old physician began his career well before 1940 when sulfa drugs first became available to treat common infections, such as pneumonia, urinary tract, and skin. Penicillin came along during World War II but was in extremely short supply until after the war ended.

"When the antibiotics arrived, we felt more secure in treating patients at home," Dr. Burgin said, "but if they didn't get well soon enough, we'd send them into the hospital.

"One routinely sent in patients with severe pneumonia, prospective candidates for surgery, such as an appendectomy; individuals with fractures, and children with severe ear infections who needed specialized attention.

"One had to keep close tabs on certain diseases like the croup. If the patient were having difficulty breathing, you sent the child in regardless of the time of day or night."

A graduate of Harvard Medical School and former member of its faculty, as are Drs. Pier and Quinby, Dr. Burgin said that practitioners derived important advantages from making house calls.

They provided, for example, a personal insight into family relationships. As valuable as it is to obtain a patient's history, being able to visit with the family in the home made the physician himself a part of the history.

"In this way," Dr. Burgin said, "one could judge the family's reaction to an illness and its capability of taking over the care of a patient who otherwise would have to go to the hospital."

Both Drs. Pier and Quinby tend to confine their present-day house calls to patients who are unable to come to the office. The patients are generally in advanced years and have multisystem disease.

"Often one can do a pretty good diagnostic job over the telephone," Dr. Quinby said, "but you really don't know the dimensions of the condition unless you see the patient."

If any question arises during a house call about a diagnosis or the seriousness of a patient's condition, Drs. Quinby and Pier unhesitatingly recommend hospital care.

"You always have to lean toward the safe side," Dr. Pier explained. "Today's high technology in the hospital can quickly confirm a malady and assess its severity or rule out the suspected illness."

Dr. Pier said, however, that some of his elderly patients fear hospitalization. In the past after spending several days in a hospital, they found themselves confused.

"Suppose the patient had some heart disease and wasn't doing too well," the MGH internist said. "You call in a cardiologist and, if something else is wrong, another specialist. Pretty soon, the elderly patient might begin to wonder what each doctor's role is. That has happened several times in my experience."

Although house calls no longer predominate on the patient-care scene, the MGH's satellite health centers in Charlestown, Revere, and Chelsea still carry out their share, accounting for some 800 home visits each year.

"Sometimes house calls can be a nuisance, such as at the end of the day when you're tired and still have three or four more calls to make," Dr. Pier declared. "But I wouldn't want to lose the advantage of seeing patient and family interactions which can be so helpful in diagnosis and treatment." ■

A New Test That Looks to the Future

Ever since 1872 when Dr. George Huntington described the brain disease now bearing his name, families afflicted with the inherited, fatal disorder have lived in a state of limbo.

Once the illness sets in, leading to progressive loss of muscle control and intellectual function, Dr. Huntington told an audience of Ohio physicians, "no treatment seems to be of any avail." His discouraging observation still holds true today.

But researchers have made such strides that the estimated 100-thousand Americans at risk for Huntington's disease (HD) may soon have a much better idea of where they stand.

At the MGH and two other major medical institutions—Columbia-Presbyterian Medical Center in New York and Johns Hopkins Hospital in Baltimore—tests have begun which reportedly can predict with up to 95 percent accuracy whether a member of an "at risk" family will actually suffer the disease.

Since the disorder does not usually manifest until a person reaches 35 to 45 years of age, a 21-year-old who takes the test can know 14 to 24 years in advance whether he or she will probably develop HD. The test result can guide the person in deciding upon a career, marriage, and raising a family.

Either parent can pass HD on to a child. Thus, at birth, each sibling in an "at risk" family has a 50 percent chance of developing the malady.

The faulty gene which causes the disease has not been found. Three years ago, however, James F. Gusella, Ph.D., Director of the MGH Neurogenetics Laboratory, made a discovery which reverberated around the world. He determined that a genetic marker consistently inherited with HD and lying near the defective gene was situated somewhere on chromosome 4. That chromosome carries about 6 percent of a person's genes, which establish inherited characteristics.

Last year, Dr. Gusella further narrowed the search for the HD gene to a tiny area on the short arm of chromosome 4. This advance permitted development of the test for Huntington's, which is known to affect between 20,000 and 25,000 people in the United States. Folk singer Woody Guthrie, who died in 1967, suffered from HD for 13 years. He originally was misdiagnosed as an alcoholic.

The test involves taking a sample of blood and studying in its white cells patterns of DNA (deoxyribonucleic acid), the chief component of genes. Geneticists look for DNA patterns matching a form of genetic marker found to be associated with the HD gene in each affected family.

Dr. Gusella said that patients who are test candidates come only from families already known to have had exposure to Huntington's. Members of such families in New England alone number about 1,000.

Current plans call for testing only 50 persons a year at the MGH during the coming two years. No one under 18 will be accepted. No upper age limit has been set.

"In using the marker for the test," said Dr. Gusella, "we not only must have a clear family history of the disease but must also be able to look at the DNA of several family members, some already of known status with respect to the HD gene. This enables us to determine what pattern of the marker travels with the defective gene in that particular family. We must study a minimum of three relatives."

In considering a candidate to be tested, investigators closely study the results of three genetic and psychological counseling sessions which the individual must attend.

Directing this program is Richard H. Myers, Ph.D., a medical geneticist with the Boston-based Huntington's Disease Center Without Walls, directed by Dr. Joseph B. Martin, MGH Chief of Neurology, and codirected by Dr. Robert G. Feldman, Chief of Neurology at University Hospital. Dr. Myers spoke of the high priority given the counseling:

"Part of the counseling is educational. We explain the risks of developing Huntington's disease and emphasize the level of accuracy of the test. It is not a perfect test. We want to be sure that when the candidate makes his choice it will be an informed choice.

"The most common reason people give for wanting to take the test is a yearning to end the uncertainty about whether they will develop the disease. Often, the concern is not for oneself . . . many people feel they would be able to adjust . . . but a fear that if they carried the HD gene and married and raised a family they might transmit the disorder to their children."

Affiliated with the Huntington's disease center since its inception six years ago, Dr. Myers said that many of the people he has counseled indicated that if they had the HD gene they would not want to have children because they fear they would not be effective parents. Knowledge that the gene was not present would end those fears.

In evaluating the suitability of candidates for the HD test, Dr. Myers and his colleagues focus heavily on any stress reactions in the interviews. Might the person consider suicide if the test result were positive? Is the individual experiencing multiple stresses, e.g., other serious illnesses, a divorce suit, a child custody fight? Perhaps then the test should be postponed.

"We have been very careful to start off with people who we think have defined psychological strengths and resources, such as a marriage partner or other close

(Concluded on Page 8)

Before an applicant for a Huntington's disease test is accepted, Richard Myers, Ph.D., conducts three counseling sessions with the individual.

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Genetic Event Can Affect Huntington's Test

(Concluded from Page 7)

companion," Dr. Myers declared.

By scheduling three sessions with a test candidate, the counselor also establishes himself as a resource to whom the person can later turn.

Even if the test result suggests absence of an HD gene, a certain number of follow-up visits is necessary because under optimal conditions there is a 1 in 20 possibility of the presence of the defect not being detected.

"This is not due to any improper performing of the test," Dr. Myers explained, "but because of the biological occurrence of genetic recombination. During formation of sex cells an exchange of genes between paired chromosomes will separate the marker from the HD gene about five percent of the time. Since we have no way of detecting that recombination has occurred, the maximum predictive value of the test is 95 percent."

Although no treatment exists for Huntington's disease, researchers at the MGH are striving to find a cure. Recently, in an issue of the British scientific journal *Nature*, members of the MGH Department of Neurology reported that they have reproduced for the first time the exact neurochemical picture of HD in the brains of laboratory animals.

By injecting quinolinic acid (a substance associated with metabolism) into the area of the brain affected by HD, the researchers found that most of the brain's neurons degenerated. Inexplicably spared, however, just as in HD, were somatostatin and neuropeptide Y neurons, two types of substances called neurotransmitters.

Quinolinic acid (QA) is known as an "excitotoxin," a class of compounds which binds to the surface of certain neurons and kills them by presumably overexciting them.

Researchers have theorized for a decade that excitotoxins may be responsible for HD. Other hospital laboratories have tested other such agents, including kainic acid and ibotenic acid, but found that, unlike QA, they did not preserve the transmitters customarily spared in Huntington's.

In the article in *Nature*, Dr. M. Flint Beal, the principal author, wrote that several features make QA an important suspect in the brain disease. For example, he reported: "It has been shown that neonatal animals are resistant to QA toxicity while mature animals are susceptible; this agrees well with the typical onset of HD in middle age."

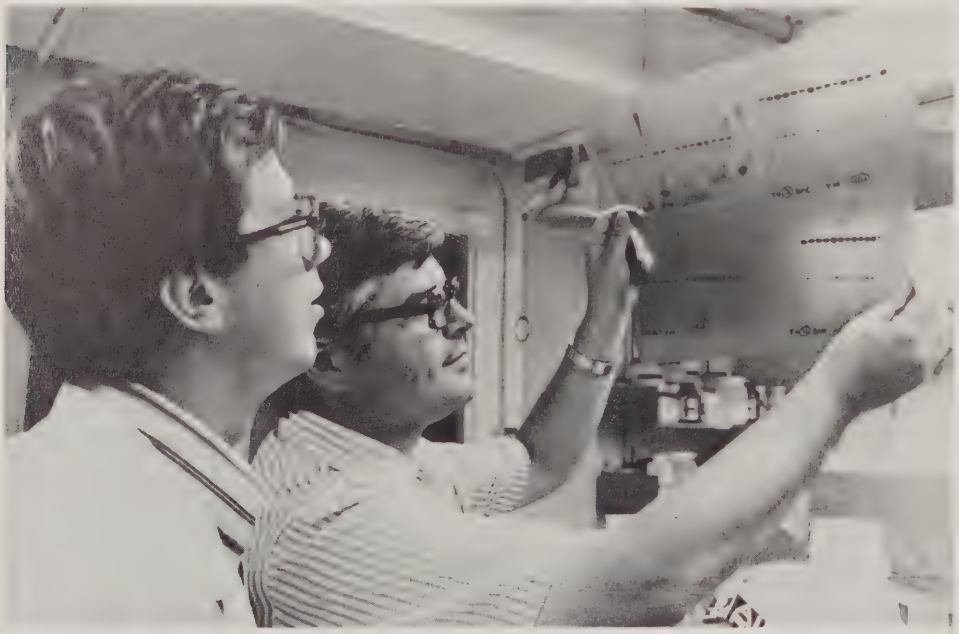
Dr. Beal pointed out that if QA proves to play a role in the course of Huntington's disease, several agents are available which can block this excitotoxin. "It is therefore possible," he wrote, "that early diagnosis using molecular genetics could be followed by therapeutic intervention in an attempt to retard the neurodegenerative process."

Dr. Gusella, who is also Assistant Professor of Genetics in the Neurology Department of Harvard Medical School, said several key questions remain as QA studies continue:

"We want to know, for instance, whether quinolinic acid, or any similar substance that could mimic its effect, is present in increased amounts in brains afflicted with Huntington's disease.

"Is QA the primary cause of the disease, or is QA's action triggered by some other substance? Even if one can block the secondary effects, one might avert much of the disease itself.

"And there's another possible scenario . . . the activity of quinolinic acid in Huntington's might be just a coincidence." ■



In the MGH Neurogenetics Laboratory, Dr. James Gusella, right, and William Whaley, Ph.D., closely scan DNA patterns on an X ray for a form of genetic marker associated with the Huntington's disease gene.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 8 November 1986

Studies Brighten Hope for a Cure for Osteoporosis

Fact Versus Fiction Concerning Chronic Illness in Children

A generation ago, few children with severe long-term illnesses grew to adulthood. Today, as a result of advances in technology and treatment, 80 percent of chronically ill youngsters reach at least the age of 20.

Accounting for more than one million of America's 60 to 65 million children, youngsters with major long-term maladies doubled in number between 1960 and 1980. The expanded survival rate generated, in turn, a host of common beliefs—some true, some false.

While serving on the faculty of Vanderbilt University in Nashville, Tenn., Dr. James M. Perrin, Director of the Pediatric Unit in the MGH's Wang Ambulatory Care Center, in collaboration with Dr. Henry T. Ireys, now of the Albert Einstein College of Medicine in New York, and the late Dr. Nicholas Hobbs, conducted a five-year study of chronically ill children. They coauthored *Chronically Ill Children and Their Families,* published in 1985.

Speaking at a recent meeting of MGH colleagues (Children's Service Grand Rounds), Dr. Perrin described some of the beliefs that have arisen about these young people.

A child with a long-term illness has an increased likelihood of developing psychological problems . . . True.

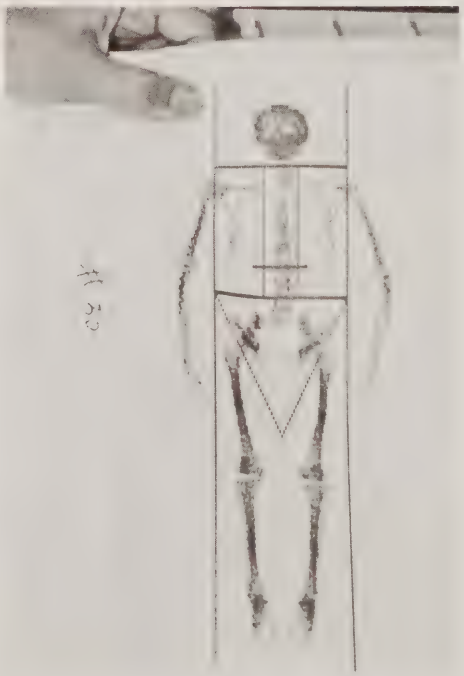
Dr. Perrin said that the risk was once considered twice that of an able-bodied child and even five times greater for individuals with sensory handicaps, such as

(Continued on Page 4)

MGH endocrinologists may have narrowed a search for a way to halt a bone-thinning disorder which affects as many as 20 million Americans over 40.

Preliminary trials at the hospital of a potential new technique for the treatment of osteoporosis have led to a significant increase in the density of spinal bone among participating patients. This improvement was accompanied by better calcium absorption and total body retention of calcium. If later tests verify these results, it would be a major advance in the treatment of the disease.

In each of two studies, physicians under the leadership of Dr. Robert M. Neer, Chief of the MGH Mineral Metabolism Unit and Director of the Mallinckrodt General Clinical Research Center, administered a synthetic human parathyroid hormone (PTH) fragment plus the body's working form of vitamin D, a substance called 1,25-dihydroxyvitamin D.



A newly acquired ability to measure total bone density is spurring research on osteoporosis.

PTH is normally secreted by four pea-sized glands in the neck and regulates the flow of calcium into and out of the bones and into and out of the body.

Vitamin D, sometimes called the "sunshine vitamin," helps to replenish calcium in bone by aiding the body's absorption of the mineral from the diet.

Eight men, aged 37 to 62, with osteoporosis of unknown origin, took part in one MGH trial and received both agents daily. In a report on the study published in the August issue of the *Journal of Bone and Mineral Research,* Dr. David M. Slovik, the principal author, wrote that "the increases in spinal bone mineral were marked and progressive during a year of treatment."

The other study involved 10 postmenopausal women with osteoporosis. Each received PTH for six weeks followed by 1,25-dihydroxyvitamin D for six weeks. The cycle was then repeated for a total test period of 18 months. Seven women, matched for age, spinal and cortical bone density, and number of vertebral fractures, acted as controls, receiving either 1,25-dihydroxyvitamin D or an inactive substance (placebo).

In a preliminary report on this work presented at the annual meeting of the American Society of Bone and Mineral Research in Anaheim, Calif., this summer, Dr. Slovik said computed tomography showed progressive and significant increases in lumbar vertebral density in the test group and progressive and significant decreases in the control group.

The MGH physicians, in collaboration

(Continued on Page 2)

MGH *News*

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EDITORIAL:

Preliminary Results, Preliminary Hope

Osteoporosis is one of the most common ailments of later years. Women are especially prone to the loss of bone density and its concomitant susceptibility to fractures. Investigators have pondered a variety of treatments over the years. The more promising have given hope of perhaps slowing down or even arresting this relentless disease.

Now MGH physicians are in the early stages of a treatment that might for the first time reverse osteoporosis. A Page 1 article describes the promising study, promising but *very* early.

A few months ago, the doctors presented their early results at a national meeting in California. Their findings with two comparatively small groups of patients over a relatively short period of time excited many of the physicians attending the meeting. After all, when dealing with a problem that has resisted major advances, even preliminary results generate hope.

The Determination to Overcome

Words are the fundamental tools that have distanced humans from the "lesser" animals. Without some form of language, of course, communication would revert to the simplistics of animals: the bee's dance to "describe" the location of honey-laden flowers, the bird's song to attract a mate or its call to worry off a competitor, or the more sophisticated, sometimes less patterned communication of the higher nonhuman primates.

There can be no question that the ability to read about the past, talk in the present, and leave a written record for the future has made civilization possible and has accelerated its progress. That is why any limitation in the capacity to communicate handicaps so many people who have dyslexia. Is it any wonder that studies sometimes equate success with a person's vocabulary? Inability to read limits the chance for leadership roles in life. That is why victims of dyslexia typically have to struggle to survive in school and in a society that increasingly expects a college education of its citizens.

In a Page 7 article, this issue of the *MGH News* lists some salient exceptions to the lack of success that plagues many dyslexics. Some—Leonardo da Vinci, Albert Einstein, and Thomas Alva Edison—achieved fame in areas in which nonverbal creativity predominated. Moreover, it is well documented that Einstein, for one, created his leaps of ideas not in words but in imagery. His general theory of relativity, for example, came to him as he visualized a man falling from the roof of a house and dropping objects as he fell. But people like Winston Churchill, Agatha Christie, and Hans Christian Andersen achieved their successes *because* of their ability with words. To the determined, dyslexia need not prove to be an overwhelming obstacle.

Osteoporosis

(Continued from Page 1)

with Drs. Daniel I. Rosenthal, John T. Potts, and Samuel H. Doppelt of the MGH, are currently recruiting patients with osteoporosis of the spine for a further trial to confirm the results to date and to gather more data.

The project will employ a newly installed sophisticated device called a total body bone absorptiometer. The instrument is one of only a limited number in the United States capable of measuring the bone in a person's entire body.

Osteoporosis develops silently over many years. Although bone constantly undergoes remodeling throughout life, once a person passes age 35 or 40 a little more bone is lost than gained each year. Consequently over time, bones become thinner, weaker, and more susceptible to damage through fracture or compression.

Osteoporosis causes 1.3 million fractures each year among Americans aged 45 and older. Of those who attain the age of 90, 32 percent of the women and 17 percent of the men will at some time have endured a hip fracture.

The disease poses a greater chance of injury to women than men because, to begin with, women generally have a much smaller bone structure. Also, women undergo a rapid decrease in bone mass during the three to seven years following menopause because of a loss of female hormones.

Multiple other factors account for the

Letter to the Editor

Dear Editor:

I read with interest the piece, "EW Nurses Help Mourners to Cope" (June–August 1986). I plan to share it with our ER staff in the hope that a follow-up program can be adopted here.

Thanks for the provocative article. A doctor here who gets the *MGH News* sent it to me. How widespread your influence is!

Rev. Henry R. Post
Director of Pastoral Care
Foote Hospital, Inc.
Jackson, Michigan

Photographs: Pages 1, 3, 5, 6, 7, Myron Daniels; p. 4 (upper), courtesy of the American Lung Association of Massachusetts; p. 4 (lower), Chris Maynard; p. 8, courtesy of Helaine Schupack, MGH Language Disorders Unit

continued calcium loss thereafter. These include an inadequate calcium intake, insufficient exercise, inability to convert vitamin D to its working form (1,25-dihydroxyvitamin D), and, in the elderly, vitamin D deficiencies due to inadequate sun exposure.

Investigators in the MGH Mineral Metabolism and Endocrine Units found in their research that elderly patients with osteoporosis have a reduced ability to form 1,25-dihydroxyvitamin D from vitamin D, a process which occurs in the kidneys, but it is not yet clear how often this impaired kidney secretion of the vitamin causes osteoporosis.

A multicenter study is presently under way to evaluate the effect of 1,25-dihydroxyvitamin D given to men and women with osteoporosis. The groups participating include the MGH's Mineral Metabolism Unit.

Physicians often prescribe estrogen replacement therapy to slow the rate of bone loss in postmenopausal women. The hormone, however, does not create new bone.

Since estrogen supplements are associated with an increased risk of developing endometrial cancer (involving the lining of the uterus), doctors customarily prescribe another female hormone, progesterone, to counterbalance estrogen's effect on the uterus, but progesterone has undesirable effects on blood cholesterol levels.

While medicine wrestles with the perplexities of osteoporosis, Dr. Slovik, who is also Director of Endocrinology at the MGH's close affiliate, the Spaulding Rehabilitation Hospital in Boston, said everyone can take measures to help conquer the disorder.

"The amount of bone that one has at the time of skeletal maturity is very important in determining how great an effect bone loss will have later in life," he declared. "Therefore, every young individual should do whatever is possible to achieve maximum skeletal mass by the time of skeletal maturity."

In the MGH's bone density testing center, Dr. Robert Neer, left, and Laboratory Technician Panfilo Federico study a patient's total body bone measurement.

Exercise, including outdoor activity, and a sensible diet that includes foods rich in calcium may help ward off osteoporosis. Exercise stimulates the formation of new bone. Exposure to midday sunshine for 15 minutes to an hour can meet the body's need for vitamin D.

Although the recommended daily dietary allowance for calcium was set at 800 milligrams (mg) for adults, the average daily intake of calcium by women in the United States has been estimated at much less—450 to 550 mg. Some researchers today believe that even the 800 figure is too low for some people.

Each eight-ounce glass of milk contains 275 to 300 mg of calcium.

There has been an enormous increase in the use of calcium supplements in recent years. Some companies which used to sell pills containing 250 mg of calcium are now offering pills containing up to 600 mg. Many different products are available over the counter.

Drs. Slovik and Neer cautioned against excessive use of calcium supplements.

"Many people have the idea that if a little calcium is helpful, a lot would be very helpful," they said. "Actually, calcium intoxication can occur with very high intakes—over 1,500 to 2,000 mg per day. This was a common problem in the past when calcium carbonate was more widely used as an antacid."

Overuse of calcium can lead to the formation of stones in the urinary tract. Anyone with a history of such problems should take calcium supplements only under the guidance of a physician.

Patients interested in volunteering for or learning more about the new treatment study should contact Ms. Margaret Daly, Research Nurse in the Mineral Metabolism Unit. Telephone 726-6723.

Patients must have spinal osteoporosis with a fracture or deformity of bones in the spine. The new treatment is not yet judged safe for patients who have other major illnesses or who already take other powerful medicines for osteoporosis. ■

A gamma scintillation spectrometer enables Dr. David Slovik to determine the amount of parathyroid hormone in a patient's blood.

To blow into a balloon, these asthmatic children first expand their lungs with a deep breath. They learn that such breaths can also help them to cope with their illness.

Chronic Illness Spawns Some Misbeliefs

(Concluded from Page 1)

blindness, or neurological deficits, such as seizure disorders or cerebral palsy.

"More recent data imply that the risks are less," he said, "but still greater than in the population at large.

"When a child reaches an age of normally increasing independence but, due to cystic fibrosis, needs physical therapy to clear secretions from obstructed airways, or, because of diabetes, must receive lifesaving insulin, or, as a result of hemophilia, must be given transfusions, the youngster has issues to contend with that are not a customary part of growing up."

Dr. Perrin said recent studies show that physicians need to sharpen their abilities to identify those children with psychological problems. The goal is to help such a child effect as normal a relationship with friends as possible. If one activity transcends capabilities, then an alternative interest must be cultivated.

Even healthy siblings of chronically ill children face a greater risk of psychological difficulties . . . True.

Many families devote much of a day to a sick child and few hours meeting the needs of a well youngster. The healthy one may feel rejected and express anger that another sibling is receiving all of the attention.

Dr. Perrin said that parents must strive to appropriately allocate their limited resources. They can also assign some meaningful family responsibility to the healthy child, taking care that this does not interfere with his schoolwork or the need to be with friends.

Specific personalities are associated with specific chronic illnesses in children . . . False.

In the 1940s and 50s, medical literature occasionally mentioned the "arthritic personality" or the "asthmatic personality." It became fashionable to claim that those personalities lead to those disorders.

"All the data we've gathered since that time challenge those claims," Dr. Perrin declared. "Most children with chronic illnesses have apparently normal personalities."

Physical therapist Deborah Webster helps a chronically ill child carry out a prescribed program of exercise.

One group of researchers from Albert Einstein College of Medicine examined a wide variety of psychological measures applied to children with such conditions as sickle cell anemia, myelodysplasia (defective development of the spinal cord), asthma, and arthritis. They found no patterns that appeared to follow a disease-specific model.

"More important," Dr. Perrin said, "they found much greater variations within a disease on essentially all of the measures than between diseases."

Long-term childhood maladies contribute to family breakups and a higher divorce rate . . . False.

The typical family with a chronically ill child spends an extra three or four hours a week on home therapies, an additional 30 hours per year on transportation to and from medical care, and an additional three hours per week on housework. In addition, the presence of long-term illness often prevents the mother from working outside the home, thereby diminishing potential family resources.

While agreeing that chronic illness levies tremendous burdens on such a family, Dr. Perrin said studies show that "the rates of divorce are the same in families with chronically ill children and those with apparently healthy children.

"In fact, I've known families in which the parents did not get along well at all and had little to do with each other; yet with a chronically ill child to care for, they pulled together, and the families became much more closely knit."

Chronically ill children with at least normal intelligence gain a more sophisticated understanding of the mechanisms of their affliction . . . False.

We learn through experience . . . how to walk, read, manipulate objects. The more experience one has, the more knowledgeable one becomes. When we apply that philosophy to children with long-term illnesses, the assumption is that they would come to understand their illnesses well. But that does not generally happen.

Dr. Perrin declared, "I suspect that we as clinicians don't typically talk much to the young folks; we address the parents. And when we do speak to the young patients, we don't necessarily do it in ways appropriate to their developmental level.

"We may teach a six-year-old about diabetes in a far too sophisticated way, discussing blood streams, insulin, and target cells, concepts that someone so young can't understand. Or we might talk to a bright 15-year-old about asthma in a

Trying to Explain Noises in the Head

Many people perceive the world as a very noisy place.

During life, one American in every five is plagued at times by a persistent head noise variously described as a hum, hiss, ringing, scraping, clicking, a roar of machinery, or a cascading mountain stream.

Four percent of the population find the noises so annoying, hindering concentration, preventing sleep, and causing such stress, that they seek medical advice.

Physicians refer to the condition as tinnitus—a perception of sounds that does not derive from any external source. Imagine, for instance, being in a room devoid of sound. If one still hears something, a hum or a ring perhaps, that something is tinnitus (accented on the first syllable).

Sometimes the condition can be explained. Some part of the body may be generating a sound that is then heard by the ear. Doctors call that objective tinnitus. In the vast majority of tinnitus patients, however, the affliction is subjective; that is, just as with some pain, the source of the noise cannot be pinpointed, and its severity cannot be measured in any objective way. In terms of treatment, therefore, subjective tinnitus poses a real dilemma for the medical practitioner.

Although tinnitus occurs among people of all ages, it predominates in adults, especially individuals with hearing difficulties.

"Insults to nearly any part of a person's hearing mechanism can probably lead to tinnitus," said Dr. Robert A. Levine, an auditory neurologist at the MGH and a research associate at the neighboring Massachusetts Eye and Ear Infirmary. "Such insults may come from noise exposure, drugs, or tumors.

"Damage to a nerve, as may occur from an acoustic neuroma, or a seizure within the brain due to epilepsy or some other disorder can also create a perception of sound."

Dr. Levine described blood flow as a common cause of objective tinnitus. A number of blood vessels, such as the carotid arteries (the main vessels nourishing the brain), pass close to the ears. Blood flow irregularities within the carotids can create sounds (called bruits) which the ear can often detect.

"When patients undergo a carotid endarterectomy [a surgical cleaning out of obstructive material from the artery in the neck], one of the first things some of the patients may realize afterward is that their tinnitus has vanished," Dr. Levine said.

A tumor called a glomus jugulare can grow into the middle ear. From the pulsing blood supply in the tumor, patients can hear their heartbeat. With the right instrument, a doctor can listen to the same sound in a patient's ear. The condition is uncommon.

Sometimes, a tangle of blood vessels called an arteriovenous malformation (AVM) will, if close to the ear, emit sounds detectable to the patient.

"Just as elimination of a carotid bruit

(Concluded on Page 6)

very juvenile way with a result that he quickly becomes bored and avoids listening.

"This is a very important area that needs improvement."

Due to frequent absenteeism, chronically ill children perform more poorly in school and thus manifest lower self-esteem . . . Basically true but with some important exceptions.

Youngsters with illnesses of long duration miss about twice as much school as others. Yet, children with such diseases as cystic fibrosis or hemophilia often do very well. The outcomes vary considerably among diseases.

Most children with chronic illnesses have a normal ability to learn, Dr. Perrin said, but because many need special health services in school they often end up in special education classes which, in reality, are meant for the cognitively impaired. So that wrong placement is one reason why they fail to do well.

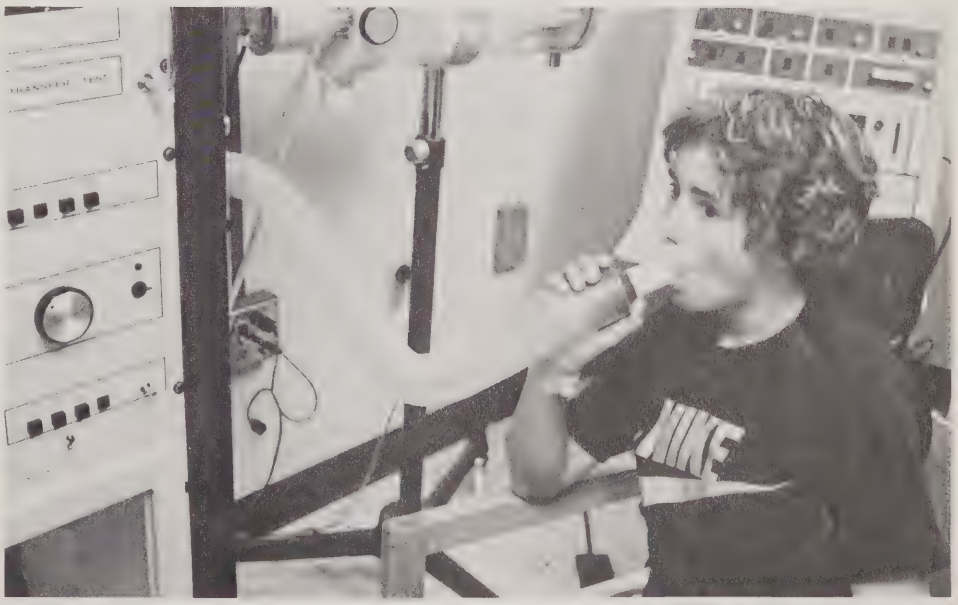
The MGH pediatrician said that sick children with normal cognitive capacity belong in the same classes where others are taught at a normal rate of development. Needs for special services, such as medicines and wheelchair access, could still be met.

Dr. Perrin, who is also Assistant Professor of Pediatrics at Harvard Medical School, sees continued dramatic improvements in medical care in a variety of ways.

At present, he said, the spotlight focuses on genetics. Many diseases can now be determined early in pregnancy. "In the long run," he predicted, "there will be some ability to change the genetic makeup . . . essentially to treat diseases before they have any real effect on the developing human."

Also, unlike some other medical specialties, he said, pediatric specialty care has typically been hospital-based, rarely in the community on any wide scale. That is changing.

"We're already moving toward community-based, pediatric service systems," he declared. "More and more children with long-term illnesses will receive their specialized care closer to home rather than in academic health centers." ■



Under MGH care for cystic fibrosis, Stephen Sodones undergoes a test that assesses the air capacity of his lungs.

Any program to help the tinnitus patient must be preceded by a full-scale hearing test to determine if organic damage has occurred.

Head Noises May Cause Extreme Tension

(Concluded from Page 5)

can terminate tinnitus," Dr. Levine said, "so can removal of the glomus jugulare and treatment of the AVM dispose of the noises caused by those disorders."

Tinnitus may stem from muscle contractions. The middle ear contains several tiny muscles, among the smallest in the body. If they contract for any reason, the inner ear may pick up sounds.

Similarly, some of the muscles in the eustachian tube, a canal leading from the middle ear to the throat (pharynx), may contract and thereby open the tube. This can cause the individual to hear a clicking sound.

Normally closed, the tube opens upon swallowing. Its function is to balance air pressure in the middle ear with that in the external environment, thus protecting the eardrum and preventing possible shock to the middle and inner ears.

Another tinnitus-causing disorder, acoustic emissions, falls into a category of its own. Coming from the inner ear, these sounds can be measured, so that the tinnitus is not subjective. But neither can it be termed strictly objective since the sounds are usually so faint that a specialist, using a very sensitive microphone in the ear canal, may be the first to hear them. This form of tinnitus is usually not troublesome to the patient.

These sounds emanate from the cochlea, a one-and-a-half-inch-long, curled tube which resembles a snail's shell. The cochlea converts sound waves into nerve impulses which then travel along special pathways to the brain. The acoustic emissions probably indicate that the cochlea is slightly "out of tune."

Dr. Levine, who is also Assistant Professor of Neurology at Harvard Medical School, said problems with the cochlea probably rank high on the list of causes of tinnitus.

Some patients who receive a cochlea implant because of hearing loss find that the device relieves their tinnitus. Surgically installed to replace nature's own failed transduction device, the implant stimulates the auditory nerve directly with electrical pulses generated through a wire inserted into the cochlea.

Dr. Levine believes that in some instances tinnitus follows an insult to the hearing process because the brain has probably been deceived.

"It could be," he said, "that the damage to the ear mechanism has not resulted in an increase in activity of the nerve fibers within, but that the fibers have become unusually silent. Expecting some excitement among the fibers but getting none, the brain may act like an automatic gain control on a tape recorder, pushing up the level of volume until a hissing results."

Although tinnitus may last varying lengths of time, ending as suddenly as it started, or endure without letup, patients commonly complain of the stress that is generated. The stress may range from minor irritation to suicidal thoughts.

Like signals given by pain, tinnitus draws a patient's attention to bodily functions. "Is this sound a warning to me?" the patient might ask himself. A thorough medical examination might find a specific underlying cause for the tinnitus that can then be treated. But the doctor might find nothing at all to be concerned about. His assurance to the patient usually is sufficient to ease tension.

Since tinnitus is for the most part a subjective experience, however, tolerance for the sounds may vary markedly. Thus, in treating patients frustrated by the sounds, the physician may decide to seek the collaboration of a psychologist to help relieve some of the associated stress. Such techniques as biofeedback may be taught to the patient to inspire greater relaxation.

The physician, in addition, may elect to prescribe for the tinnitus patient types of drugs which also seem to work against some pain, perhaps at a psychological level.

It may have been drugs, though, which brought on the problem in the first place. One of the commonest drugs to cause or aggravate tinnitus is aspirin. Dr. Levine said that taking one or two aspirin tablets every four hours probably would not trigger the noises, usually a ringing in the ears, but patients with conditions such as rheumatoid arthritis may be taking up to 30 aspirins daily to quell their inflammation and pain.

Coffee, tea, red wine, grain-based spirits, and such foods as cheese and chocolate have also been implicated as potential causes of tinnitus.

As long ago as 400 B.C., Hippocrates, the famous Greek physician known as the Father of Medicine, wrote about tinnitus. He indicated that internal noises could be overcome by external sounds. This concept has led to a development of masking devices which replace the tinnitus sound with a less offensive one.

The devices, however, have met with resistance from some patients who complain that the instruments do not provide sufficient benefit to bother with them.

"Major breakthroughs don't seem to be around the corner," Dr. Levine said. "Like everything else, one must first understand the disorder, such as what part of the auditory system is malfunctioning. Only then can one begin to try to understand how to intervene to improve the situation.

"I think that right now we're in that stage of trying to separate the various forms of tinnitus and understand where the defect lies. Once that can be pinpointed, then ways will become available to tackle each problem at its own level." ■

Coping With Dyslexia When It Surfaces After Childhood

Leonardo da Vinci . . . Albert Einstein . . . Winston Churchill . . . General George S. Patton . . . Hans Christian Andersen . . . Agatha Christie . . . Thomas Alva Edison.

Notwithstanding the diversity of their careers, these notables shared a common predicament. All suffered from an inherited, neurological, language disability.

The disorder, called dyslexia, hampers the brain's ability to process information in an organized and timely fashion. An estimated 25 million people in the United States alone are affected.

As the names above make clear, dyslexia is typically not associated with low intelligence, emotional disorders, lack of motivation, or laziness.

But the bright dyslexic's behavior patterns, in particular, can create those false impressions. Typical examples: the individual reads aloud well but does not comprehend what is read . . . fills the mind with important details but cannot organize them on paper . . . uses many words out of proper sequence in sentences . . . cannot spell, or even form letters properly . . . and holds a writing tool as if it were a weapon. Inability to complete an exam within a time limit is one of the most damaging shortcomings.

In people with dyslexia, writing deficiencies usually reflect reading and oral language difficulties as well.

Using syllable cards, reading therapists Helaine Schupack, left, and Mary Chatillon teach bright dyslexics how to assemble words through their Latin and Greek roots.

Reading therapist Charles Herron, left, helps 50-year-old Arthur Smith, a senior mechanical designer, comprehend key components of an essay.

Most laymen think of dyslexia as a child's malady since it customarily surfaces during childhood. The fact is that ever since the early 1970s when federal and state governments began mandating special help for young handicapped people, including dyslexics, many individuals with that affliction have been diagnosed for the first time after already entering college.

How did they manage to reach college level? Mary M. Chatillon, Director of Reading Disabilities in the MGH Language Disorders Unit, explained that these children were especially bright and while in primary and secondary school compensated for their problems.

"They may have scored very well in oral reading exams, for example," she said, "even though their minds could not correctly process the words. At home, well-meaning parents usually stood ready to help their child with answers in order to clear a classroom hurdle."

Invariably, the brightness which carries the child through public school encounters an impasse in college. Remembering a lecture is usually not good enough. College tests often determine what a student has learned from both oral instruction and books. Without proper tutoring . . . as well as special accommodations on the part of the school, such as permitting untimed testing . . . the student faces probable failure.

Recent autopsies on the brains of some dyslexics (who died from other causes) revealed for the first time structural differences from so-called normal brains, but Dr. Vincent P. Perlo, an MGH neurologist and Director of the hospital's Language Disorders Unit, pointed out:

"This doesn't really change the situation very much. In most cases, if a person has dyslexia and receives appropriate remedial help, the condition can largely be overcome. The problem is finding the dyslexic people early in life."

Physicians have known for some time that in most cases dyslexia is inherited. "Efforts have been made to locate the faulty gene," Dr. Perlo said. "As with any genetic abnormality, sooner or later investigators will find the gene. I do think, however, that we are still a few years away from accomplishing that."

Of 32 dyslexics counseled by Helaine Schupack, a reading therapist in Dr. Perlo's unit, none is under 19 years of age. She devotes four weekdays to clients at the MGH and the fifth as a Consultant on Dyslexia at Brown University in Providence, R.I., where she earned bachelor's and master's degrees in English.

Charles F. Herron, another MGH reading therapist, instructs 25 or 30 dyslexics. Three other specialists work evenings to accommodate people who do not have other time available. The wait for an opening in an evening session is almost two years.

Since teaching strategies and methods of compensating for problems is lengthy and intensive work, requiring a lot of repetition, reinforcement, commitment, and patience, the therapy is best carried out on a one-to-one basis.

Dr. Perlo's unit attracts a wide variety of people, many in professional fields, who have reached a point of crisis in their

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Dyslexic Handicaps Take Many Forms

(Concluded from Page 7)

lives.

One student read so slowly that when he first took a GMAT (Graduate Management Admissions Test) he scored in the low 400s, out of a possible 800. After special training and permission to take the exam untimed, he scored 750 and was accepted at Harvard Business School.

Another young man sought to improve his poor writing skills. His supervisors at work cautioned that unless he wrote better he could not expect to advance in his career. He already had earned a Ph.D. in chemistry.

A medical student detoured from his studies to obtain instruction on how to overcome a language sequencing difficulty. He easily learned entire procedures, but if a test inquired what preceded and followed a certain step in the cycle, he felt lost. His mind could not handle the parts, only the whole.

Some people, on the other hand, deal comfortably with details but cannot grasp the main ideas. Mrs. Schupack employs visual aids to demonstrate how in an essay, for instance, each paragraph helps to give the essay structure.

"Frequently, you have to teach dyslexics to do what other people do intuitively," she said. "For a young woman who couldn't remember what people said to her, we suggested that she vocalize, repeating the remarks to herself. This has long been a common method of remembering names. Now, if the lady is asked to meet someone at 4 o'clock on 3rd street, she is not likely to show up at 3 o'clock on 4th street."

Most colleges today, such as Brown, will accept known dyslexic students if satisfied that they can do the work. Many individuals living in the Providence area who are tutoring such Brown students received training at the MGH.

The university often allows tape recorders in class as well as untimed examinations, even oral testing. Some students can bring minimal notes to an exam to serve as memory cues. To avoid distractions, a student is sometimes tested in a room separate from the rest of the class.

If a Brown student previously undiagnosed as dyslexic is found to be in academic difficulty, the dean will often screen the youth for possible evidence of that affliction. The dean might ask, "Does anyone else in your family have reading, writing, or speech problems?"

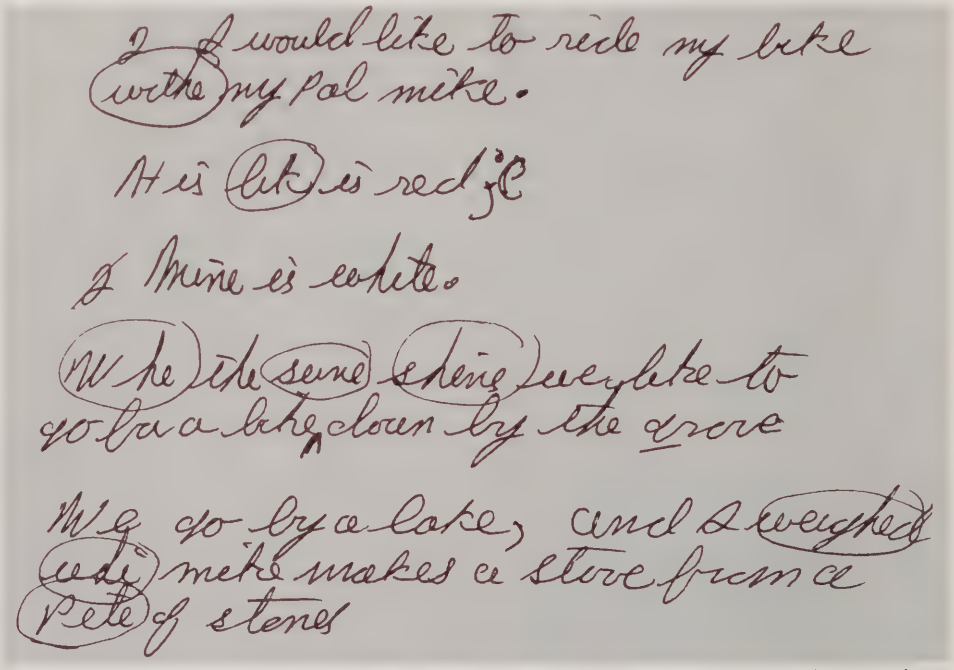
Mrs. Schupack will also be consulted. "It's not difficult to make the diagnosis," she declared. "The tests we employ have been used for years and are excellent."

Dr. Perlo, who is also Associate Clinical Professor of Neurology at Harvard Medical School, said, "I suspect that with any high-level [bright] dyslexics, if we had been able to sit in with them at kindergarten or first grade, we would have been able to detect indications of some trouble.

"We strive to educate as many people as we can about the importance of discovering the undetected dyslexic."

Dr. Perlo said that his unit once conducted a pilot study to determine if the same techniques used to assist dyslexic children could be applied to adults.

"We found that the adults responded even faster," he said, "because they were more mature. They could assimilate the instruction. It was unbelievable in some cases the amount of improvement that we could obtain." ■


I would like to ride my bike
with my pal mike.
His bike is red.
Mine is white.
When the sun shines we like to go for a bike hike down by the grove.
We go by a lake, and I waded in. Mike makes a stove from a pile of stones

This is the handwriting of a college student who failed in his first year. He is trying to write:
I would like to ride my bike with my pal Mike.
His bike is red.
Mine is white.
When the sun shines, we like to go for a bike hike (word is missing) down by the grove.
We go by a lake, and I wade in. Mike makes a stove from a pile of stones.

MGH News

Massachusetts General Hospital, Boston, Massachusetts Vol. 45 No. 9 December 1986

Lowered Asbestos Use Fails to Check Illness Toll

Offering a New Way To Anchor Dentures That Slip and Slide

People who have lost their teeth and cannot tolerate dentures are finding a remedy in a Swedish technique developed 20 years ago but newly introduced in this country.

Devised by an orthopedic surgeon, the technique eliminates the ordeal of slipping and sliding dental plates by securing artificial teeth to the upper or lower jawbone.

Impressed with the method's European success rate of well over 90 percent, oral and maxillofacial surgeons at the MGH have learned the procedure to offer it. Only a handful of other institutions in the United States is presently doing this work.

The difficulty with traditional false teeth arises because the jawbone eventually shrinks after the loss of natural teeth. Many people who experience this bone loss discover to their dismay that, instead of seating firmly, their false teeth shift about, irritate the gums, and make chewing difficult. Even speech is sometimes affected.

Some 30 million Americans are missing teeth, and of these people an estimated 3 million cannot wear dentures because of the physical changes in their jaw or because of psychological problems.

"The patient who has a very difficult mouth to make a denture for is the one who stands to benefit the most from the Swedish procedure," said Dr. R. Bruce Donoff, Chief of Oral and Maxillofacial Surgery at the MGH and Chairman of that department at the Harvard School of Dental Medicine.

"This is not a denture that lies passively on the oral tissues. It's securely anchored. The patient's perspective of what he has is totally transformed. He becomes more confident and more comfortable socially, at his job, and at home."

Dr. Donoff visualizes invaluable other uses for the so-called Branemark System, named for the developer, Dr. Per-Ingvar Branemark, Director of the Institute for Applied Biotechnology in Gothenburg, Sweden.

The MGH specialist plans to adapt the system in research aimed at helping oral cancer patients who have lost their teeth

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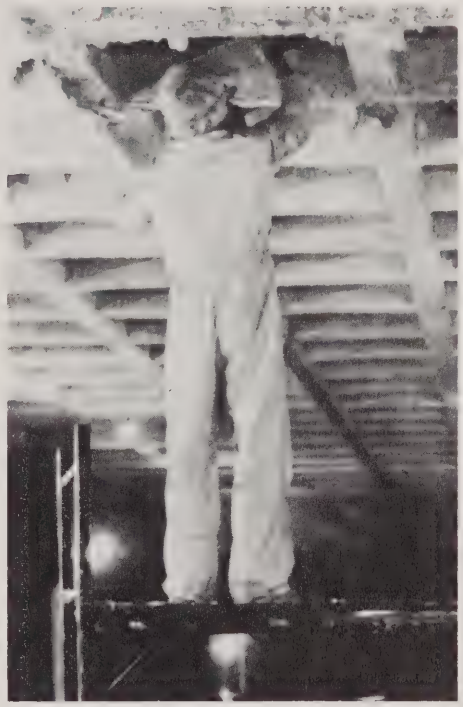

Millions of Americans living today have had significant exposure to asbestos.

Despite scaling down of America's industrial consumption of asbestos, potentially fatal disease caused by this mineral will be detected well into the next century.

Physicians are diagnosing fewer new patients with asbestosis—a scarring of the lungs caused by asbestos fibers—but the incidence of mesothelioma—an asbestos-induced tumor—has risen steadily.

Latency, the time that elapses between exposure and diagnosis, explains the varying trend. Ten to twenty years may pass before signs of asbestosis appear. Mesothelioma may not be discovered until 30 to 40 years after the patient's initial contact with asbestos fibers, and the same is true for some instances of lung cancer, very common among those exposed to asbestos.

A physician, nationally known for his studies of occupational diseases, cited in a talk at the MGH a survey that he and his colleagues conducted.

Dr. Irving J. Selikoff of the Mt. Sinai School of Medicine in New York told a large audience at MGH Medical Grand Rounds that "from 1981 to 1983, we examined 2,907 insulation workers in 19 American cities.

"Asbestos had been removed from insulation in 1973. Thus, the workers' exposure had stopped around that time, except for repair work.

"To July 15 of this year, we had 187 deaths in this group, 37 percent due to lung cancer; 13 percent, mesothelioma; and 12 percent, asbestosis. So it does not follow to say simply that cessation of exposure is going to help very much those exposed in the past."

The chance of developing lung cancer increases 50 to 70 times for a person who smokes cigarettes in addition to the ex-

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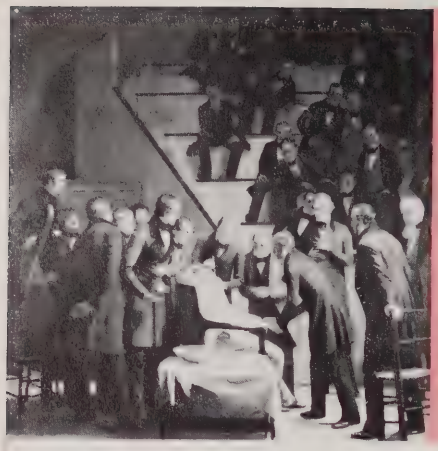

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EDITORIAL:

Bridging the Chasm

Plastic surgery has a distinguished history at the MGH. The hospital's Jonathan Mason Warren introduced that specialty to America. Although a general surgeon at the MGH led the first team ever to replant successfully a severed limb, plastic and orthopedic surgeons now perform replantations here routinely. MGH replantation surgeons still hold the record for the most fingers successfully replanted for one patient: seven. Both plastic and orthopedic surgeons here have performed a number of remarkable operative feats. At Shriners Burns Institute, MGH plastic surgeons use their skills to save the lives of severely burned children. And these skilled surgeons transform the badly scarred bodies into more natural looking skin.

But for all these tours de force—maybe because of them—the MGH plastic surgeons have not been known for their cosmetic surgery. Sure a few of them have always carried out some cosmetic procedures. Until recently, however, most of these specialists emphasized the life and limb side of their skills. Now, though, while the reparative and restorative talents still predominate, cosmetic surgery has established its own important niche.

Helping to bridge the chasm between the two different subspecialties were procedures that combine both talents: the creative techniques, for example, that not only save the lives of burn patients but also make the scar tissue look better in order to improve the quality of life of those saved. From such surgery, the purely cosmetic step to tuck back prominent ears is a short one. The person born with a long nose is no more to blame for it than the burn victim is for deep scars. Both problems, in fact, can lead to major psychological trauma. It is good that MGH plastic surgeons recognize the importance of cosmetic surgery.

Illustrating the Reality

In 1978 the specialty of oral surgery changed its name to oral and maxillofacial surgery. This was done to emphasize the wider scope of skills and practice of these specialists. A Page 1 article in this issue demonstrates yet another kind of procedure these surgeons are capable of performing. The estimated three million patients who may benefit show just how important the new method can become. More important, the ability to carry out the technique illustrates how far the reality of oral and maxillofacial surgery is from the public perception.

At this point, however, it is difficult to predict whether the Branemark System will become commonplace in the United States.

Asbestos

(Continued from Page 1)

posure to asbestos fibers.

A number of recent studies points to a significant shift in the source of patients with asbestos-related disorders.

During World War II when the nation devoted all of its resources to the war effort, the most common exposures to asbestos were among shipbuilders. Not much other construction was going on. After the war, shipyard labor forces slowly dwindled and those in other industries expanded. Many firms in the construction trades routinely turned to asbestos for fireproofing, insulating, and other purposes.

Dr. Selikoff said that some 20 million Americans living today had a significant amount of asbestos exposure between 1940 and 1980. "Deaths from these exposures," he said, "are far from their peak."

Much concern is being expressed not only for past workers but also for a sizable population still breathing or swallowing asbestos dust.

In October, President Reagan signed legislation mandating inspections and cleanup work within the next 33 months at an estimated 35,000 schools with potential asbestos hazards. The law seeks to protect 15 million children and 1.4 million workers at these schools.

The new statute adds $100 million to a previously authorized $600 million to counter the asbestos threat in the schools. Dr. Selikoff said that the school people at greatest risk are the custodians and repair personnel who come into closest contact with the source of loose asbestos.

"We're beginning to see mesothelioma in telephone repairmen," he said, "because all through the years they were stringing wire in buildings, nobody told them that they were working near asbestos and had to take precautions.

"We're now in the midst of a study of sheet metal workers. So far we've found that of the workers first exposed 30 years ago, about 50 percent have abnormal X rays."

Only recently, Dr. Selikoff and his investigators turned back to the maritime

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Photographs: Pages 1, 3 (lower), courtesy of Drs. Nancy Sprince and Christine Oliver; pp. 3 (upper), 6, Myron Daniels; p. 5, courtesy of Dr. James May; pp. 7, 8, courtesy of Dr. Bernard Hitzig

Drawings: Page 4, courtesy of Nobelpharma USA, Inc.

Dr. Christine Oliver obtains pertinent data from George McIntosh of Boston, a school custodian who suffers from asbestosis.

scene and began to look at what happened to the crews of ships following their launching.

"Many of the seamen were constantly repairing asbestos fittings," he said, "and the vibrations of the ships often caused sailors to inhale the dust even as they slept. Of the first one thousand seafarers we've examined, those who went to sea before 1955, about 40 percent have abnormal X rays."

Dr. Nancy L. Sprince, who codirects occupational medicine at the MGH with Dr. Christine Oliver, said in an interview that people with asbestosis can remain stable for many years, but their condition does not improve. Treatment is aimed at preventing the disease from worsening. The degree of exposure is critical to what effect asbestos will have on the body. The asbestosis patient complains most about shortness of breath upon exertion.

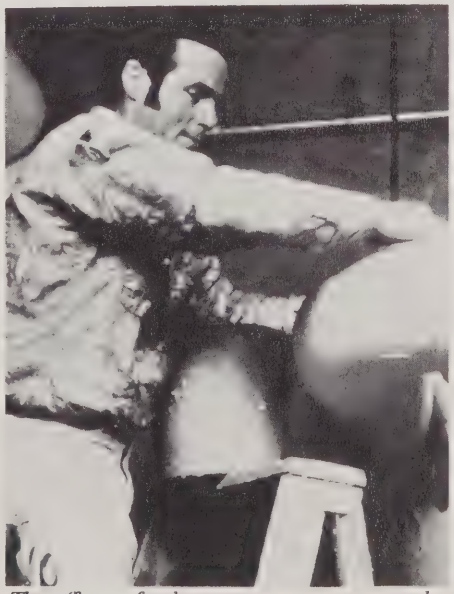
Mesothelioma takes much less exposure than asbestosis. People who have worked with the mineral in construction or repair work for just one summer have developed mesothelioma years later.

Mesothelioma may be a tumor in the lining, or pleura, of the lung, or a growth in the membrane, or peritoneum, covering the abdominal cavity. Since the patient may have swallowed some of the asbestos fibers, the disease may have come in part from the gastrointestinal tract.

Dr. Sprince said that usually less than a year elapses between the diagnosis of mesothelioma and death. Few patients survive five years or longer. The tumor is one of the deadliest of cancers and is often difficult to differentiate from types of cancer which originate elsewhere in the body and spread to the pleura.

Despite the absence of a treatment that can reverse asbestosis or mesothelioma, a diagnosis is extremely important for sufferers who may be entitled to compensation. Many are still young with families to support.

The MGH's Occupational Health Clinic encounters few instances of mesothelioma. About 80 percent of the clinic's patients have had significant asbestos exposure, but most are either still able to work or are relatively healthy retirees. All need to be watched, however.



The effects of asbestos exposure may not be felt until many years later.

Drs. Sprince and Oliver instruct their patients to stop cigarette smoking and to visit the clinic periodically for X rays and other tests for any sign of cancer. Some individuals will need vaccinations against influenza or pneumococcal pneumonia.

The two physicians, both Assistant Professors of Medicine at Harvard Medical School, are also studying the body's immune system to see how asbestos affects it.

Volunteers from the construction trades, such as pipe fitters and coverers, sheet metal workers, boiler makers, and laborers, undergo a battery of tests and then, if all is well, a lung lavage. This is a procedure performed by fiberoptic bronchoscopy for suctioning T-lymphocyte and macrophage (scavenger) cells from an airway. The cells normally defend the lungs against toxic agents.

Similar cells are also obtained from people who have had varying degrees of asbestos exposure. The cells from the two groups of people are then compared in the MGH's Pulmonary Immunology Laboratory.

Dr. Oliver has also been investigating so-called natural killer cells, granular lymphocytes, which seem to play a role in identifying virus- or tumor-infected cells and then attaching to those cells, destroying them.

"Studies we've conducted have supported earlier data that natural killer cell activity is reduced even in nonsmoking and ex-smoking asbestos workers," Dr. Oliver declared.

"We're now looking to see if these infected cells respond normally to substances, such as gamma interferon and Interleukin 2, that have been shown to stimulate natural killer cell activity. We're also interested in learning what effect beta-carotene [a substance found in vegetables like carrots and tomatoes] may have on the natural killer cells in asbestos workers as compared to those in nonexposed people."

Dr. Oliver said that as a result of the immunologic tests being performed at the MGH and elsewhere it may one day be possible to identify people at greatest risk for asbestos-related disease through specific markers and to monitor those individuals very closely. "And if we can retarget the immune system," she added, "we may be able to effectively intervene against such disease." ■

Getting a Firm Grip On Loose Dentures

(Continued from Page 1)

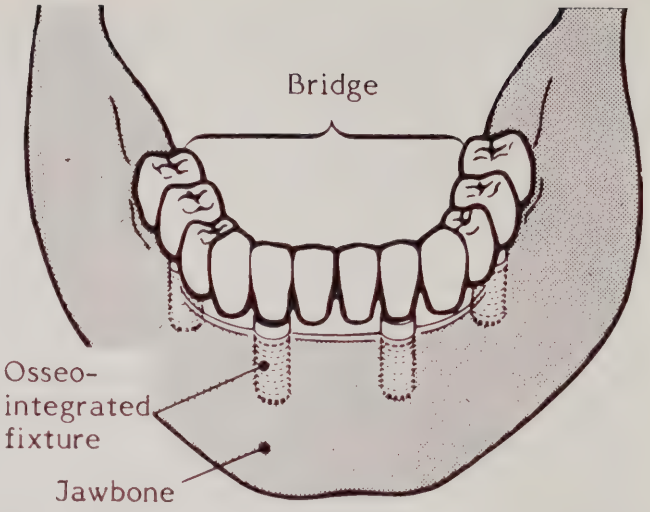
and portions of jawbone through surgery or radiation therapy.

The anchors—or fixtures—employed in the Branemark System can be implanted into segments of a patient's hip bone. After three or four months during which the bone grows and bonds with the fixtures—a process called osseointegration—the segments of bone and metallic devices would be transplanted together to reconstruct the missing portion of jaw.

Dr. Edward B. Seldin, an MGH oral and maxillofacial surgeon, said "there is every reason to believe that this will work.

"The purpose of doing the implantation directly into the iliac crest of the hip is to incorporate the fixture into what is destined to be its natural setting. One then does not have to worry about getting it firmly established in a graft which might turn out not to have an appropriate blood supply."

Struggling with a slipping denture ends when titanium fixtures are implanted in the jawbone and attached to the artificial teeth.



In other patients the small implants can be placed directly into bone previously grafted to restore jaws.

The Branemark System's key feature is the titanium composition of its screwlike fixtures and other parts. Human tissue tolerates titanium well, thus minimizing chances of infection. Even the instruments used to install the system are fashioned of titanium. This avoids the possibility of a metallic interaction which could eventually weaken the bond between the fixture and the bone.

Dr. Branemark's method came to North America five years ago when the University of Toronto Dental School began using the technique at Toronto's Mt. Sinai Hospital.

Two years ago, Dr. Donoff sent a two-man team to that city to learn the procedure and introduce it at the Harvard School of Dental Medicine. The team was comprised of Dr. Charles N. Bertolami, an MGH oral and maxillofacial surgeon, and Dr. Paul A. Schnitman, Director of Implant Dentistry at Harvard. While Dr. Bertolami studied the surgical work involved, Dr. Schnitman, a prosthodontist by training, concentrated on how the artificial teeth were fabricated.

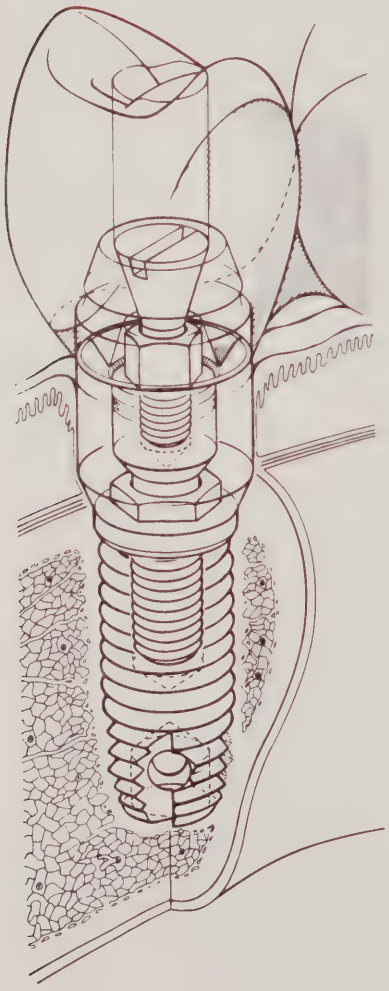
Dr. Donoff also obtained special training, attending courses offered by the University of Rochester in New York. And a professor at the University of Texas Health Sciences Center visited the MGH to instruct other members of Dr. Donoff's team.

Dr. Bertolami said that the Swedish method can be used to replace just a few teeth but, initially at least, the MGH is focusing on installing entire upper or lower sets.

The procedure is carried out in a sterile environment after the patient receives a sedative and a local anesthetic.

Four titanium fixtures can support a

Installing the Implant System



To install the Branemark System fixtures that will anchor a patient's false teeth to the jawbone, the oral surgeon first draws back the gums to expose the bone. Then five titanium drills, each slightly larger than the preceding, are used to make the appropriate holes, which reach about the diameter of a pencil.

The holes must then be threaded to accommodate the fixtures, which are also threaded. "It's not like a screw going into wood," said Dr. Charles Bertolami, an MGH oral and maxillofacial surgeon, "but like a bolt going into a nut. The fit is that perfect."

The fixtures, which are hollow and also threaded internally, are then covered with a temporary cap, and the patient's gums are put back into place. During the ensuing three or four months as the bonding of bone and metal (osseointegration) occurs, the patient can continue to wear regular dentures.

Once the fixtures are solidly in place, the oral surgeon screws a hollow device called an abutment cylinder into each anchor. Its increased length now brings it to the surface of the gums.

The new bridge with teeth made of porcelain and metal also contains holes through several of the teeth. These are centered over the holes in the abutment cylinders, and gold screws are used to fasten the teeth and bridge to the cylinders. ■

Boosting One's Self-Esteem With Cosmetic Surgery

A decade ago, major elements of society looked upon plastic surgery for appearance sake alone as frivolous.

As a consequence, leading medical centers continued to emphasize reconstructive, rather than cosmetic, surgery.

Today, the picture has changed radically. Owing in part to the movement for women's equality, aesthetic surgery is attracting a surge of interest.

While reconstructive procedures still predominate, the number of patients undergoing operations at the MGH for principally cosmetic reasons has more than doubled in the past 10 years.

Dr. James W. May, Jr., Chief of the hospital's Plastic Surgical Division, said that because of the change in public attitudes, plastic surgeons have come to feel better about the validity of their work to improve appearance.

Most now agree that techniques designed to make people feel more comfortable with their appearance can be just as helpful to them as reconstructive surgery can be to a trauma victim.

Even those plastic surgeons engaged solely in reconstruction also employ aesthetic techniques. The transfer of a big toe to a hand to make a thumb, for example, demands finely detailed cosmetic planning if the hand is to look natural.

"Virtually every procedure in plastic surgery is now carried out with some aesthetic considerations," Dr. May said.

He recalled an article that appeared some years ago in the journal *Plastic Reconstructive Surgery*. Written by the editor, the piece was entitled, "Logs Versus Harpsicords." The editor said that reconstructive surgeons have a duty to do more than just fill in a defect. We must also shape the area, be creative with it, and make it attractive, he argued. Create a harpsicord, not a log!

Suppose a patient had a skin cancer on a large nose that had a hump and drooped at the tip. "A hole filler," Dr. May said, "would remove the cancer and put a skin graft in it, leaving the nose more unattractive than before because it now also has a scar. A harpsicord builder, on the other hand, would remove the cancer and then shorten the nose, narrow it, and contour the tip, creating a better looking, disease-free nose."

Looking at surgical statistics in most hospitals, one recognizes that the number of operations to improve the quality of life predominate over those to prolong life.

Dr. May said that people look forward to enjoying whatever years they have remaining and that cosmetic surgery fits in logically with that goal.

At the MGH, females, including a number of teen-agers, comprise about 85 percent of the patients who have cosmetic surgery. The most common operations sought by the younger group are breast reduction (mammoplasty) and recontouring of the nose (rhinoplasty).

In general, the plastic surgical staff at the MGH is active in a variety of procedures, including transplanting hair, reconstructing eyebrows or a nose following an injury, such as a burn; doing a face-lift and/or brow-lift to minimize aging changes, pinning ears back toward the skull (otoplasty), removing fat from around the eyes to make them look younger (blepharoplasty), eliminating fat abnormally distributed in other parts of

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Roberta Reed of Duxbury, Mass., before and after undergoing a face-lift

whole upper or lower plate, but as a precaution the surgeon, as a reserve, also installs a fifth in a centrally located spot under the gums. "It is left asleep," as Dr. Bertolami put it.

He underlined the importance of using a special drill to make the jawbone holes for the fixtures.

"The titanium drill operates at only 12 revolutions per minute," he said. "This compares with a speed of from 100,000 to 250,000 rpm in drills that are used for general dental work, such as fillings."

The slow speed prevents a buildup of heat which could destroy cells in surrounding bone and cause loss of bony tissue.

(See diagram and description of how the technique to anchor the false teeth is accomplished.)

While the potential market for the new dental implant system is sizable, its cost must be considered. Dr. Bertolami said the cost primarily reflects expenses for the surgical work and the making of the prosthesis.

"The surgery may not be extremely expensive but entirely comparable to the cost of other implant methods," he said. "A real price difference comes, however, in the making of the bridge. It is very much more complicated than the fabrication of an ordinary denture." ■

Evaluating Requests for Cosmetic Surgery

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the body (a suction lipectomy), tightening the abdomen (an abdominal lipectomy), and enlarging the breasts.

Plastic surgeons often disagree among themselves over what is purely cosmetic and what is a combination of reconstructive and cosmetic. Dr. May regards reconstruction of a breast after a mastectomy as cosmetic and reconstructive. It is reconstructive, he said, because it is designed to restore a normal feature but also cosmetic in that appearance after reconstruction is critically important.

The suction lipectomy has been a subject of considerable controversy among surgeons. "The procedure," Dr. May said, "can be very useful in face-lift surgery to remove extra fat from the neck, in a reduction mammoplasty to take fat from under the arms, and in improving 'saddlebag' deformities in the thighs. But the suction lipectomy has received a bad name because some doctors use the technique where it is not indicated and may not even know how to apply it safely."

Recontouring the face, brow, and neck is the most time-consuming cosmetic procedure, requiring up to five hours. The work takes place in the hospital's Surgical Day Care Unit with the patient sedated as well as under a local anesthetic.

The plastic surgeon smooths the sagging skin in the jowls and neck and then tailors the facial skin to fit the recontoured defatted neck and lower face. Over time, gravity may have allowed eyebrows to drop down over the orbits. To correct this, the surgeon will move up the brows and scalp, then smooth the wrinkles, including the lines at the edge of the eyes as well.

"I think that of all types of surgery, plastic surgery is most akin to psychiatry," said Dr. May, who is also Associate Clinical Professor of Surgery at Harvard Medical School. "The reason is that by the age of 50 almost everyone can theoretically be improved by cosmetic surgery. Although most people are not disturbed by signs of aging, some do want corrective measures taken and come to us. In the interviewing process it is essential that we get a 'feel' for the reasons behind the cosmetic consultation."

The aim of cosmetic surgery is to help the patient have a better self-image. Often one finds people seeking to alter certain features because they are convinced that others dislike them as a result of those features. "That is almost never true," the doctor said.

The woman whose husband is straying and who wants to make her face and figure more attractive to draw him back is being unrealistic. The maneuver almost never succeeds.

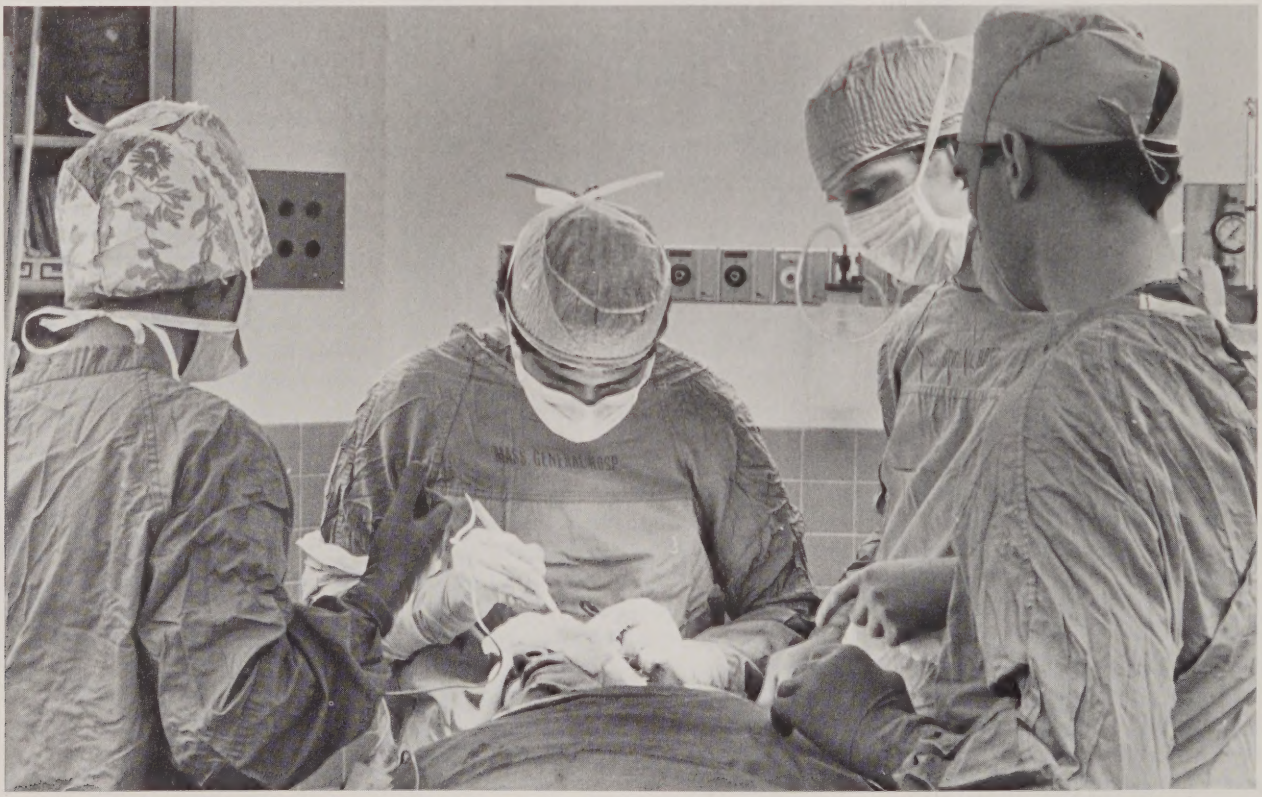
"If during the interview, the plastic surgeon can perceive that the prospective patient is not so much unhappy with herself but with her circumstance in life, then a red light should go on," Dr. May declared.

On the other side of the coin, cosmetic surgery can benefit the woman whose family has grown and who now wants to return to the work force. Although competent, she might feel that with so many young people in her profession she would have a better chance to succeed if a surgical specialist can remove signs of her advancing years.

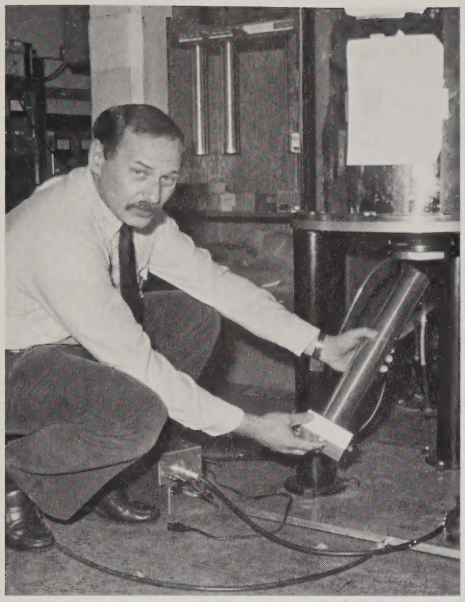
Operations for appearance sake only are not covered by third party payers, but since postoperative care is relatively routine, most of such patients avoid costly hospitalization.

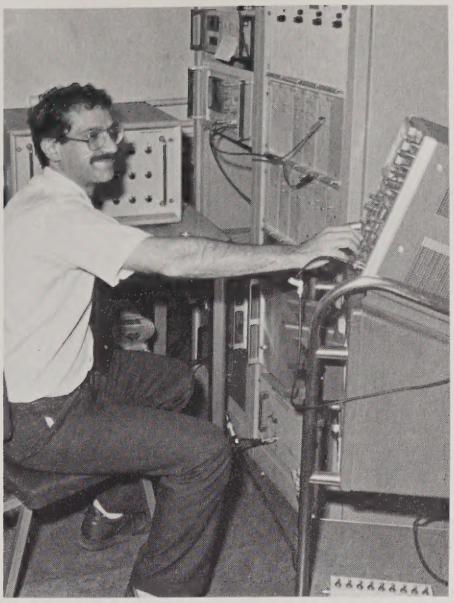
"The only purely cosmetic surgical patients who usually remain in the hospital are those who undergo face-lifts," Dr. May said, "and they stay only one night."

Although only a small part of plastic surgery, cosmetic surgery is a valued and important service provided with increasing frequency at the Massachusetts General Hospital. ■



Dr. Luis Cuadros of the Plastic Surgical Division performs a facial procedure in the Surgical Day Care Unit, assisted (clockwise) by Dr. David Bryan, Dr. Peter Gee, and Sheila Kading, RN.





Dr. Bernard Hitzig, left, inserts a probe containing test material into a magnet while, at right, Dr. Paul Okunieff, sitting at a spectrometer, prepares to adjust the magnetic field to obtain optimal test results.

A Potential New Weapon Against Disease

Medicine's diagnostic arsenal may soon make room for still another weapon to fire the imagination.

A team of MGH researchers is working with a device that can analyze biochemical reactions even as they occur in living cells and organisms.

Body fluids have long served as an indicator of cell activity, but frequently what they show in a test tube bears little relationship to what is actually going on within the cells.

With the technology called MR (magnetic resonance) spectroscopy, one can directly and noninvasively monitor cell function and thereby determine not only the presence of a problem but often also how best to deal with it and even assess progress of the treatment.

The MGH studies are being conducted at the Francis Bitter National Magnet Laboratory at Massachusetts Institute of Technology where engineers have fashioned their own spectrometers.

Fewer than a handful of such devices with human study capability are in operation in the United States. Grants from branches of the National Institutes of Health and from the American Heart Association support the MGH investigations.

Bernard M. Hitzig, Ph.D., of the MGH Pulmonary Unit and a visiting scientist at MIT, said that MR spectroscopy is based on similar principles as magnetic resonance imaging. However, where MRI uses the relaxation times of molecules in order to draw an image, spectroscopy looks under stronger magnetic influence at different nuclei, such as phosphorus, carbon-13, and fluorine, and offers a spectrum, or chart, detailing the concentration of different chemical compounds in tissue and allowing measurement of the reaction rates.

Dr. David M. Systrom, also of the MGH Pulmonary Unit, currently directs spectrometer studies at MIT that can be invaluable in understanding disease states and one day optimizing training for athletes.

The device can be used to identify development of a so-called "anaerobic threshold." That is the point at which the oxygen supply to cells can no longer keep up with demands.

When a person runs, for instance, there is a speed at which the runner can maintain a steady pace for long periods. Any great pickup in momentum will usually lead to rapid fatigue through acid buildup in the body's cells.

The threshold separates two kinds of energy available to the body. The most efficient mechanism uses oxygen. The other, called anaerobic metabolism, uses another substance.

Until MR spectroscopy came along, there was no ideal way to detect the anaerobic threshold. Most techniques were invasive, requiring a taking of blood or the performance of a biopsy (removal of a snippet of tissue for laboratory examination). Noninvasive, spectroscopy not only offers a new dimension to the study in athletics but also in the probing of muscle and other diseases.

At the University of Pennsylvania, Dr. Hitzig said, spectroscopy already has been introduced in a neonatal intensive care unit to determine how the brains of prematurely born infants are functioning.

The spectrometer measures, among other compounds, adenosine triphosphate (ATP), which is produced through both aerobic and anaerobic metabolism to supply cell energy. If a baby develops a high degree of acidity in its brain cells, the test will reveal the change and the need for more oxygen.

The diagnosis of McArdle's disease, a genetic disorder characterized by an inability to tolerate exercise, used to be

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Taking a Quick Look Back

Sophisticated instruments to diagnose and track disease have been introduced in such rapid-fire succession in recent years that many lay people are confused over just what does what.

The report in this issue on MR spectroscopy prompts a brief recap on the function of leading diagnostic techniques.

Computed Tomography (CT) provides excellent images of both complex bony surfaces and soft tissue structures, such as organs.

Magnetic Resonance Imaging (MRI) also reveals "what is there" but while demonstrating superior sensitivity in detecting some disorders, such as multiple sclerosis, it is sometimes less specific than CT.

Positron Emission Tomography (PET) conveys data on bodily function, such as blood flow and oxygen metabolism. To do this, PET employs small amounts of various radioactive tracer chemicals.

Magnetic Resonance (MR) Spectroscopy noninvasively measures the relative concentrations of biochemical compounds in living cells and thus a sequence of events that may be taking place.

A detailed look at the first three instruments appears in the April 1986 *MGH News*.

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A Method of Analyzing Basic Cell Activity

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complicated and time-consuming, but today, with MR spectroscopy, the illness can be identified within five minutes.

Dr. Paul Okunieff of the MGH Department of Radiation Medicine is studying MR spectroscopy to learn how this technology may help point to effective treatments for tumors.

"Tumors may have areas so low in oxygen that they are significantly protected against radiation," he said.

With spectroscopy, Dr. Okunieff hopes to learn which cancerous growths have such cells. Thus, he could predict even before a particular treatment has started whether there was a probability of failure.

At present, the only way of knowing whether a growth is responding to radiation treatment is to determine by X ray whether the tumor has shrunk. Spectroscopy may also provide the answer and at the same time reveal whether various additional modalities that are known to target on certain aspects of physiology would be beneficial.

The spectrometer may provide further assistance. The radiation therapist already possesses certain techniques to minimize damage endured by the brain during radiation treatments. It is occasionally unclear, however, whether an abnormality in the brain was caused by the treatment or the tumor. Studies with laboratory animals indicate spectroscopy may clarify that matter.

Using an MIT spectrometer, Dr. Hitzig is conducting major studies of the body's so-called "acid-base" balance. Both acids and bases (alkaline compounds) can be very harmful. The ability of cells to live depends on acid-base levels being balanced under various conditions.

"The acid-base status in the brain is more critical than in any other tissue because subtle changes in that status can alter the ways we breath and think," Dr. Hitzig said. "We're trying to learn how the brain manages to regulate its intracellular environment under conditions of severe stress, such as while breathing carbon dioxide."

Another aspect of Dr. Hitzig's acid-base work revolves around cardiac surgery. When patients undergo a heart operation, their bodies are cooled to slow their metabolism and thus decrease the heart's need for oxygen.

"When a person is cooled down, however, the acid-base status shifts," the MGH biologist said. "No one knows how to regulate that because humans normally maintain a constant body temperature level."

To try to solve the puzzle, Dr. Hitzig and his colleagues have been studying chameleons, other lizards, and two species of salamanders—newts which are aquatic and redbacks which are lungless. Their body temperature shifts whenever the ambient temperature does.

By testing with the MR spectrometer, the MGH researchers are learning how the lizards and salamanders regulate their acid-base status as their body temperature changes. The spectrometer also explains how the creatures manufacture their cellular energy products and what their concentrations are under different temperatures.

Information such as this may help the cardiac surgeon regulate the acid-base balance in patients and determine the amount of oxygen needed to protect the heart.

Dr. Hitzig describes spectroscopy as a powerful diagnostic tool. "The ability to examine biochemical mechanisms and reactions as they occur in living cells instead of in test tubes already has dramatically altered the explanation of how muscles derive their energy," he said. "The possibilities with the spectrometer seem endless." ■

Dr. Steven Dubinett is guided into a large magnet for an MR spectrometer test of leg exercise capabilities.